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Views of a Surgeon.*

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I cannot help feeling that there is a mistaken idea abroad that the problems with which the surgeon is faced are largely decided, and that the future usefulness of the profession to the nation rests with laboratory workers with a leaning towards the investigation of animal diseases, and with executive officers for the prevention of epidemics in animals or the protection of the public health from animal sources of disease.

That this false impression appears to be widespread gains support from the fact that at the last International Veterinary Congress, in spite of there being a section of Veterinary Medicine, Surgery and Obstetrics, no provision was made for the presentation of a single paper from a purely surgical point of view.

Surgery is more than a craft or an art, it is a science by which minds can be strengthened in the endeavour to link up cause and effect and it will be my endeavour this afternoon to draw your attention to some methods by which surgery can advance both the practice of its art and its science.

Operative Surgery.

Among the numerous discoveries which have followed the pioneer work of Pasteur none has been greater than the benefaction conferred on man and the domesticated animals by Lister, who opened the way to make surgery comparatively safe.

The difficulties under which so many veterinary practitioners have had to work, as far as surgical work upon animals is concerned, have led to slow progress in this field and it is the slow adaptation of Lister's principles to surgical technique which belittles us in the eyes of the public, who realise the safety of surgery in man and are expecting similar results in our surgical dealings with animals.

The great increase in the number of dogs, with their many and varied surgical conditions, has done much to awaken interest in surgical cleanliness.

It is those who have adapted themselves to this end by providing the means to operate with that feeling of safety from contamination of their field of operation, who, given sound judgment, are likely to achieve success. How easy it would be for many practitioners to adapt part of their premises to an operating room and introduce a steam steriliser, by means of which a boy with a little training could always have ready the necessary gowns, cloths, and swabs, and so do away with a considerable amount of the risk of infection of wounds which, to say the least, may cause days of suffering to the patient.

Though the scope for surgical interference is more limited in our larger animals the same endeavour to obtain surgical cleanliness should be our aim, so that if misfortunes deprive us of our case, it is plain to the most critical layman that every care has been taken to reduce risks to the minimum.

In these days of transport of stock from farm to market by motor, and there is hardly a district where this means is not now available, veterinary surgeons will in the future more frequently avail themselves of this means of bringing their surgical cases to an up-to-date operating room rather than take the necessary sterile equipment to the farm.

I am constrained to draw your attention to such matters as I know there is a special committee of the S.S.P.C.A. at present considering means of diminishing the pain associated with operations.

Fortunately this committee is willing to be guided in these matters by members of the profession, but the raising of the issue indicates the importance of how careful we should be in preventing unnecessary suffering in our surgical dealings with animals.

By closer attention to the methods which have grown out of the work of Lister more suffering can be prevented than by restricting the exercise of the skill of the surgeon considered by him appropriate for the occasion.

Diagnosis and the Practitioner.

The most pressing need in many cases is for an earlier and better diagnosis. In our animals we will always be faced with the difficulty that they are unable to help us by describing symptoms and it is only when clinical signs of ill-health appear that we are called upon to apply treatment. The observation of such signs in the first instance often depends upon the intelligence and care bestowed upon them by their owners. All problems of disease are essentially problems of diagnosis and the earlier this is made the more successful treatment is likely to be and advance from the present position depends upon that.

General medicine and surgery are now too big to be mastered by any one ordinary individual.

In the old days a general practitioner was assumed to possess all useful veterinary knowledge and frequently did, but now-a-days there is a growing tendency for laymen to choose what they consider an appropriate higher authority in the shape of one or other of the research institutes, veterinary colleges, university departments, and in the south, veterinary advisers.

There seems to have arisen some loss of prestige among practitioners with the public in spite of the fact that the present-day practitioner possesses a much wider training than his predecessor.

DEPT. OF VET. MEDICINE

* Presidential Address to the Scottish Metropolitan Division, N.V.M.A., at Edinburgh. May 27th, 1931. Received for publication November 4th.

In these days of pathologists, bacteriologists, helminthologists, entomologists, protozoologists, bio-chemists, radiologists, geneticists, poultry experts, and many others, all experts in their own domain, how is the ordinary stock-breeder or animal owner able to select the right individual capable of throwing light upon an obscure problem of disease? It is obvious that the right person to be consulted in the first instance is the general practitioner, and in the majority of cases he will be able to come to a diagnosis, but if not, and the owner is willing, then the services of one or other of the specialists should be obtained. On no account should the general practitioner hand over his case to a specialist for treatment and thus get rid of his responsibility until he has satisfied himself that he can give his client a sound judgment based upon the opinion obtained from the specialist consulted.

This maintenance of responsibility of the practitioner in the dealings between owners of animals and the various specialists and research institutes appears to me to be the key position to enable him to remain the guide and friend of him who should be his client.

We would all do well to remember that a good deal of the happiness of life lies in its responsibilities.

In passing, the place of so-called veterinary advisers in the scheme of relationship between practitioner and specialist appears to me to be indefinite. It is obvious that they cannot advise in all branches of veterinary work, therefore why not indicate to everyone who they really are—bacteriologists, experts in poultry diseases, pathologists, helminthologists, nutrition experts, etc., group them in suitable centres and thus create the very necessary diagnostic team to work in conjunction with those general practitioners who are alive to their responsibilities to the public and the upholding of professional prestige?

Research from a Surgical Point of View.

The craft side of surgery will for ever remain, as it is quite impossible to prevent accidents, but there is a scientific outlook which must not be lost sight of, the aim of which is prevention of disease. There are diseases the causes of which we are still in the dark, *e.g.*, cancer, osteo-arthritis, where the surgeon still continues active as the last line of defence in maintaining the usefulness of many animals.

As practitioners condemned to practice surgery,' the advanced signs of disease we are constantly seeing should ever keep our minds stimulated to try and discover earlier stages.

All practitioners are therefore potentially clinical research workers. In many cases our enquiring minds may pass easily along the old paths of accumulated knowledge, but we must be ever ready to follow new paths.

Many of the old paths in surgical conditions appear to lead into that convenient diagnostic refuge, heredity—witness such a result in the diseases scheduled under the Horse Breeding Act of 1919.

The question often debated in my student days "whether there is such a thing as an hereditary disease" is still a challenging one and I anticipate much discussion in the coming years over the surgical conditions scheduled in the act just quoted.

Clinical research is the weapon by which the main new paths can be opened up and as practitioners are often unconsciously the pioneers in this work, a brief general consideration of its method and supplementary methods will conclude my remarks.

Clinical research implies the fullest enquiry into the detailed character of all clinical signs discoverable, so that all the complex processes of a disease can be arranged in their sequence of occurrence and of time.

The difficulties of getting at the beginning of many of the chronic diseases affecting our domesticated animals are great, as it is not easy and often impossible to obtain a life-history of their previous illnesses, but, on the other hand, we have the advantage that life can be terminated at will in an investigation and a thorough search made of the body for all traces of deviation from the normal functioning of organs and tissues.

The beginnings of disease must always be obscure and all practitioners know how great mortality is among young stock, but do we appreciate the effect of varying degrees of deviation from the normal which do not necessarily lead to early death but may in time produce defects?

By collecting evidence from the time of birth, where possible even before birth, up to old age, when chronic changes are the striking evidence, we will come to understand many of the conditions which are regarded at present, probably wrongly, as definite diseases, *e.g.*, spavin, ringbone, and shivering in the horse; nephritis in the dog.

It is only by acute and critical clinical observation that the clinical picture can be built up.

The clinician cannot hope to solve all the intricacies of such wide problems without the scientific worker, nor can the latter proceed far without the observations of the clinician.

After all this arduous work, which constitutes clinical research, sifting and co-ordination are necessary before we are able to deduce the cause or interplay of causes producing the disease under consideration. We are then in a position to apply the experimental method of research to prove or disprove our deductions gained from clinical research.

Experimental research is a much easier method, as from an experiment we expect an answer, "yes" or "no," though supplementary experiments may be necessary to answer new problems arising from the first—but still again an answer, "yes" or "no," is expected. How fortunate veterinary research workers are in being able to carry out a direct experiment to reproduce the disease under investigation, whereas in the case of the human being so much has to be determined by analogy. Analogical research has, however, played an immense part in the past in elucidating the cause of many diseases, and at present there is a bewildering output of research being published dealing with nutritional diseases which, from analogy, appears likely to open many new paths for the understanding of obscure animal diseases which have defied the bacteriologist.

Though I have stressed the importance of the clinical worker in any scheme of research into animal diseases, it will be generally recognised that combined research is the ideal method of attack.

Finally, I would draw your attention to the importance of investigation of the chronic diseases, such as the surgeon so often sees, not only from the point of view of relieving

animal suffering but because such investigations may help to solve the mystery of parallel conditions in man.

Discussion.

Mr. W. Nairn said that he should like to express his appreciation and offer his congratulations to the President for his address. He found that many of the views expressed were similar to his own. Concerning loss of prestige by the practitioner, he himself was not conscious of a loss in this respect, but he deplored the direct approach to the farmer which characterised the behaviour of some research institutes. He preferred the method of approach *via* the practitioner, by which co-operation could be secured and disharmony avoided. For example, the owner could give but an incomplete history of a case at best, and the practitioner could, in the light of his local experience, modify institutional enthusiasms which might otherwise be liable to arise. Numerous instances where such have arisen could be given, particularly in cases where mineral deficiencies were involved, and not always to the credit of the institution.

Dr. T. W. M. Cameron wished to associate himself with the remarks of Mr. Nairn in thanking the President for his address. He (Dr. Cameron) could not agree with it all, particularly with the remarks made on co-operation. This might be ideal in theory but was not so in practice. As a general hypothesis he thought the principle of co-operation for both veterinary and medical practitioners with research institutes should be adopted. Too often, however, disease was considered as due to a single cause and the possibility of multiple causation was overlooked. Especially so was this the case in connection with parasites, where an alliance between parasites and protozoa, or between parasites and bacilli, might raise what separately would be looked on as only sub-acute conditions, to the level of acute diseases associated with heavy loss. He would remind the members of the recent work on liver flukes and gas gangrene organisms giving rise to the so-called "Black Disease" of sheep in various parts of Australia.

He thought that the surgeon should also be looked upon as a specialist and regarded as one link in the chain for restraining disease. In his view the time was coming when the practitioner would function chiefly as a diagnostician, who would pass on his cases to the specialist for one or another mode of specialised treatment, and who would pass on his problems to institutes for elucidation and guidance.

Dr. J. Russell Greig observed that he would also like to emphasise the necessity for co-operation between the institute and the practitioner. He had realised that many problems could only be approached with the aid of the practitioner and had enlisted that aid; he was working in close contact with the practitioner. That was not all, however, because research work had now become so specialised that workers in one institute must seek the co-operation of others in other institutes. He was proud that there was co-operation between the staff at Moredun and the staffs of every other research institute in Scotland, concerning one or another of their many problems.

The scheme to co-ordinate the work of veterinary research institutes throughout Great Britain might not fully materialise, but it was a fine ideal. Many diseases could only be solved by a team of workers in a team of institutes.

The main theme of the address—surgical research—was somewhat outside his province, but like others he wished to voice his appreciation of the address.

Principal O. Charnock Bradley said that he desired in a collective manner to convey to the President their appreciation of his address, and to add that he personally had enjoyed it. He would like to emphasise that he always regarded the practitioner as just as much a specialist as some of the others who had been specifically mentioned, in any scheme of veterinary research. He was, like the others, a unit, and not by any means an unimportant unit, in the control and suppression of disease; he fully merited a share of the public appreciation.

Notes on the Pathology and Treatment of *Neuro-lymphomatosis gallinarum* observed on Fowls during Eight Outbreaks.

H. P. Bayon.

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In the *Veterinary Record* of September 5th, 1931, pp. 907-11, I described the anatomical and microscopical lesions found in a fowl suffering from acute *Neuro-lymphomatosis gallinarum*. Reference was then made to other outbreaks of the disease and to the remarkable improvement, it seemed amounting to a cure, which had occurred in eight fowls out of thirteen which had been fed by hand with lettuce, bakers' yeast and skim milk in addition to mash, once it was eaten spontaneously.

It was admitted that these numbers were yet too small to warrant any conclusions, but that the results obtained were sufficiently encouraging to justify the continuation of the investigations on a more extended scale.

Environment of the Outbreaks.

I then obtained particulars of the initial stages of all these outbreaks by means of personal visits to the farms; it was noted that the disease is commoner on the larger poultry farms, where 500 fowls or more are kept and that on these neuro-lymphomatosis is confined to pullets aged four to eight months of one or two particular strains.

Losses can be very heavy, in one instance (C.E.) 220 pullets out of 500. In all instances investigated the fowls were well kept and seemingly well fed; access to green grass was not lacking. In the majority of farms, housing, runs, appliances could have scarcely been improved and left little to criticise in the others.

The food in three outbreaks was derived from the same firm; since this was a concern with large output, no stress can be laid on what may be pure coincidence.

The birds themselves came from many different sources but on each farm (with one exception, where the birds affected originated from three different flocks) one strain only developed the ailment—the other fowls, even of the same breed, eating the same food, escaping infection; so that food alone does not seem to explain the pathogenesis. The one exception was a farm where the fowls were suffering from two distinct forms of paralysis; these are still being studied.

The prevalence of neuro-lymphomatosis in the pullets of certain strains—a fact definitely ascertained by McGaughey (1931)—has been fully confirmed.

Symptoms and Diagnosis.

In addition to the symptoms previously described, it has been noticed that birds recovering from light acute attacks may exhibit a frequent jerky shaking of the head; this symptom is common in fowls suffering with coryza, but in these cases the air-passages were free. Blindness as a result of the disease was mentioned by some farmers; on examination it seemed that the hens were suffering from lack of visual accommodation, owing, perhaps, to the iris being infiltrated with lymphocytic cells.

The differential diagnosis between single instances of acute neuro-lymphomatosis and the many other forms of symptomatic paralysis, which are frequent in poultry, cannot be accomplished otherwise than by accurate microscopy of the brain, periphereal nerves and inner organs.

The chronic form can be usually recognised on necropsy by finding the swellings in the course of the peripheral nerves or near the neural roots.

Pathology.

It can be confirmed, as the result of more extensive experience of the disease, that acute attacks may be light and pass unnoticed. This explains how slight lesions of the nervous system are frequently seen in what appear to be healthy fowls.

The obvious anatomical features described by many authors are chronic sequelæ which develop gradually.

The lesions of neuro-lymphomatosis differ in the acute and chronic types of the disease, but it will be appreciated that such differences are frequently recognisable as due to the intensification and after-effects of a single original morbid process. Accordingly, it may be suggested that it would be perhaps more correct to speak of " early " and " late " stages.

Taking the brain first, in the early stage this may show the peri-vascular infiltrations or " cuffs " which are illustrated in Fig. V. Though such lesions are noticeable even under low magnification, yet the areas in which they occur are usually so irregularly scattered in the cortex, that a few sections further in the paraffin-block may not reveal any other cuffs. Groups or congregations of lymphoid cells may also be seen; the pyramid cells of the brain are usually affected, being swollen and staining badly with methylene blue. Finer details still await confirmation from the examination of a series of sections which are being cut.

In late stages of neuro-lymphomatosis the lesions are apparently similar to those described, but the type of cell predominating in the cuffs and groups, belongs to a glial type and as such originates from the brain substance, whilst lymphoidal cells should be the result of vascular migration.

It is in the peripheral nerves that the early and late stages differ most in appearance, even to the naked eye. In the acute type the affected nerves are, at intervals, reddened or slightly swollen; this slight swelling is due to the infiltration of the spaces between the nerves with a serous fluid, so that the appearances of a discrete œdema are present. Under the microscope a hyaline spacing or gap is seen between the nerve-bundles, accompanied by greater or lesser lymphoidal infiltration, either scattered or in the form of fusiform accumulations. The neural axis is not degenerated at this stage, as staining with Marchi will prove. This is an essential distinction from poly-neuritis due to vitamin B deficiency.

It is later that the well-known irregular globose hypertrophic swellings develop; these are usually a striking feature of the pathology of this avian ailment. A photomicrograph of this condition is seen in Fig. VI, the relative specimen having been obtained from Kansas to show that the lesions of " range-paralysis " in the United States of America and those of epizootic fowl-paralysis in this country are essentially the same.

It is easily seen that the sciatic nerve is at least five-fold its usual diameter and that the increase is not only due to the cellular infiltration previously mentioned, but also to the hypertrophy of the neural axis. Such an active new production of neural tissues, in my experience at least, does not occur in mammals. The fusiform cellular infiltrations are seen as dark spots in the centre of the nerve and lower edge of the figure; in addition, the connective-tissues nerve-sheath participates in the general increase, being thickened and considerably more vascularised than usual.

Both in the early and late stages a diminution of the erythrocytes and increase of lymphocytes can be detected; but neither hæmatological change is evident without careful comparative examination, though greater or lesser degrees of such anæmia and lymphocytosis are present in all diseased fowls.

The bone-marrow usually shows an increased activity of the lymphoid elements, which in late stages of the disease may frankly predominate. Similarly, both in early and late forms, visceral accumulations of lymphoid cells, particularly in the liver, spleen, kidney and intestines occur; in the order of frequency mentioned. Real circumscribed tumour formation (lymphoma) has been seen in single birds in the course of an outbreak; this peculiarity has also been noticed by several other observers.

This frequent occurrence of visceral tumours originating from cells of the lymphoidal series, confirms, to my mind, the opinion expressed in a previous paper—that *Neuro-lymphomatosis gallinarum* can be grouped among those diseases whose predominant feature is a proliferative increase of cells of the lymphocyte type; with this distinction, that in neuro-lymphomatosis the lesions are predominantly noticeable in the nervous system, as the name rightly indicates.

A discussion of the pathogenesis of the disease must await the result of the transmission and other experiments which are being performed to elucidate the many obscure points of this economically, no less than scientifically, important disease.

Parasitology.

Chronic coccidiosis, which some authors consider to be a fertile, if not preponderant cause of the disease, was found in one hen (No. 5) whose anatomical lesions were, moreover, distinguishable from those of the fowls on the same farm, but suffering with acute neuro-lymphomatosis.

The cestode *Davainea proglottina* was found in eight fowls; a high proportion for the number of necropsies made, *viz.* 21. In one outbreak (Nos. 22-25), three out of the four fowls examined were heavily infested with this tape-worm. Here also further enquiry is being pursued, because this parasite appears to be frequently present in other diseases, wherein the symptoms differ from those of genuine neuro-lymphomatosis.

Etiology.

The observation of neuro-lymphomatosis in the field seems to indicate that though several different parasitic infestations, but more particularly *Davainea proglottina* and coccidia, may initiate paralysis, yet the acute and chronic form of the disease, *Neuro-lymphomatosis gallinarum* may develop without the presence of such parasites.

Nutritional factors also play a part in the complex

FIG. I.—FLACCID PARALYSIS OF BOTH LEGS AND WRYNECK IN A WHITE WYANDOTTE.

FIG. II.—SPASTIC PARALYSIS OF BOTH LEGS IN A RHODE ISLAND RED.

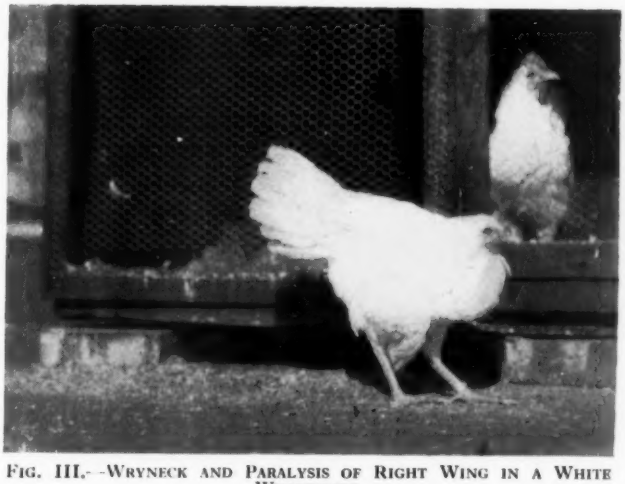


FIG. III.—WRYNECK AND PARALYSIS OF RIGHT WING IN A WHITE WYANDOTTE.

FIG. IV.—THREE RHODE ISLAND REDS IN VARIOUS STAGES OF RECOVERY AFTER TREATMENT.

FIG. V.—PERIVASCULAR CUFFS IN THE BRAIN OF RHODE ISLAND RED WITH ACUTE NEURO-LYMPHOMATOSIS.

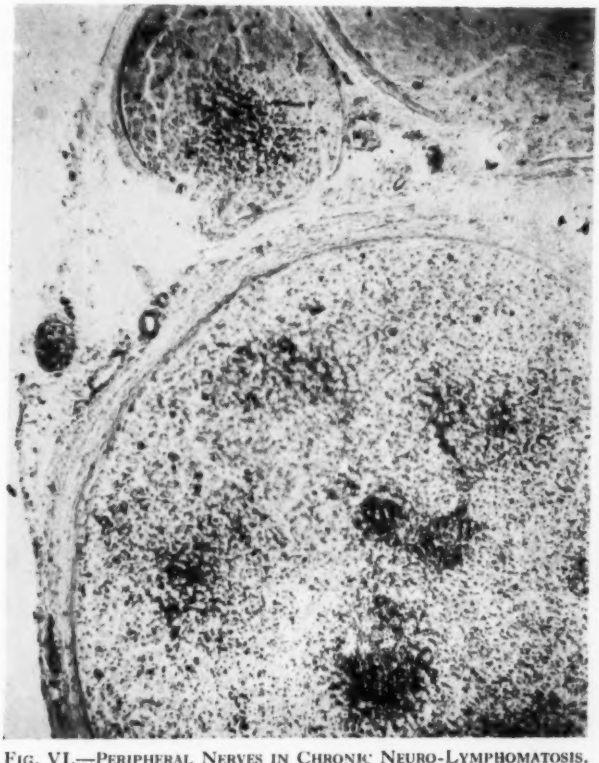


FIG. VI.—PERIPHERAL NERVES IN CHRONIC NEURO-LYMPHOMATOSIS. *Specimen of Prof. L. D. Bushnell.*

Table Recording Observations on Paralysed Fowls from July 16th to November 25th, 1931.

(H. P. Bayon.)

Serial No.	Breed	Sex	Source	Date of Arrival	Diagnosis of Paralysis	Course of Ailment	Result	Notes
1	R.I.R.	Hen.	D.D.	July 16th, 1931.	Generalised, complete.	Killed for microscopy.	Killed July 16th.	*D. proglottina.*
2	,,	,,	,,	,, ,,	,, ,,	Complete recovery.	Alive and active.	
3	,,	,,	,,	,, ,,	,, ,,	,, ,,	,, ,, ,,	
4	,,	Cock.	,,	,, ,,	,, ,,	,, ,,	,, ,, ,,	
5	W.L.	Hen.	,,	July 31st, 1931.	Both wings undersized.	No better.	Killed August 23rd.	Chronic coccidiosis.
6	R.I.R.	,,	H.F.	Aug. 8th, 1931.	Spastic left leg.	,, ,,	Died August 9th.	*D. proglottina.*
7	,,	Cock.	F.L.	,, ,,	Both legs, right wing.	Complete recovery, exc. wing.	Alive and active.	
8	,,	Hen.	H.F.	Aug. 18th, 1931.	,, ,, spastic.	No better.	Died September 15th.	
9	,,	,,	,,	,, ,,	,, ,, flaccid.	,, ,,	Died October 12th.	Lymphoma; cæcum.
10	,,	,,	,,	,, ,,	,, ,, ,,	Much improved, active.	Alive and active.	
11	W.W.	,,	J.S.	,, ,,	,, ,, left wing.	No better.	Died September 21st.	*D. proglottina.*
12	R.I.R.	,,	H.F.	,, ,,	Right leg.	Recovery.	Killed September 15th.	
13	,,	Cock.	M.L.	Aug. 26th, 1931.	Both legs flaccid; drowsy	Steadily worse.	Died September 3rd.	
14	,,	Hen.	H.F.	Aug. 20th, 1931.	Complete, undersized.	Slight improvement.	Died September 13th.	
15	W.W.	,,	,,	,, ,,	Left leg, tumor.	No better.	Died August 26th.	Lympho-sarcoma.
16	R.I.R.	,,	,,	,, ,,	Complete, flaccid.	,, ,,	Died August 24th.	*D. proglottina.*
17	,,	,,	,,	,, ,,	Left leg, later complete.	Rapidly worse.	Died August 31st.	
18	,,	,,	,,	Sept. 4th, 1931.	Left leg weak, limps.	Improved, then relapsed.	Alive and active.	
19	,,	,,	,,	,, ,,	Both legs, cannot stand.	Improved.	,, ,, ,,	
20	,,	Cock.	,,	,, ,,	Both legs.	Much improved.	Killed October 17th.	*D. proglottina.*
21	W.W.	Hen.	,,	Sept. 10th, 1931.	Right leg weak.	No better.	Killed October 6th.	
22	R.I.R.	,,	C.E.W.	,, ,,	Left leg undersized.	,, ,,	Died September 11th.	Lymphoma, heart.
23	,,	,,	,,	,, ,,	Both wings undersized.	,, ,,	Died September 14th.	*D. proglottina.*
24	W.L.	,,	,,	,, ,,	Complete undersized.	,, ,,	Died October 9th.	*D. proglottina.*
25	,,	,,	,,	,, ,,	Right wing.	Gradually worse.	Died September 26th.	*D. proglottina.*
26	W.W.	,,	H.F.	Sept. 19th, 1931.	Wryneck, left leg.	Complete recovery.	Alive and active.	
27	,,	,,	,,	,, ,,	Left leg.	,, ,,	,, ,, ,,	
28	,,	,,	,,	,, ,,	Right wing.	Steadily worse.	Killed October 6th.	
29	R.I.R.	,,	,,	,, ,,	Paresis, both legs.	Much improved.	Alive and active.	
30	,,	,,	,,	,, ,,	Failing eyesight.	Active, improved.	Killed October 10th.	
31	W.L.	,,	A.D.	Sept. 23rd, 1931.	Paresis, both legs.	Greatly improved.	Alive and active.	
32	R.I.R.	,,	J.S.	Sept. 24th, 1931.	Left wing, tumour.	No better, operated.	Died November 6th.	Fibro-sarcoma.
33	,,	,,	H.F.	Oct. 6th, 1931.	Left wing, chronic.	No better.	Died October 17th.	Ovarian cyst.
34	W.L.	,,	C.E.W.	Oct. 20th, 1931.	Both legs.	Right leg better.	Alive and active.	
35	R.I.R.	,,	,,	,, ,,	,, ,,	No lasting improvement.	,, but ailing.	
36	W.L.	Cock.	,,	,, ,,	Complete, both legs.	Great improvement.	,, and active.	
37	R.I.R.	,,	,,	,, ,,	Complete, emaciated.	At first no change; then improving.	Died October 23rd.	Lympho-sarcoma.
38	W.W.	,,	C.L.	Oct. 24h, 1931.	Complete, wryneck.	Much improvement, walks.	Alive and active.	

picture of the ailment; but however important, these also do not explain its appearance in single pullets of a batch, all of which are fed in the same manner. Such questions cannot be answered otherwise than by experiments: these are being gradually performed.

Treatment.

For the purpose of study 38 fowls with paralytic symptoms were obtained from eight different sources and kept at the Molteno Institute, where they were fed daily by hand with lettuce leaves, and a wet mash consisting of: maize meal and pollards, 50-lbs. each; fish and meat meal, 5-lbs. each; salt and minerals, 1-lb. each=one cwt. Bakers' yeast was given at intervals and the daily wet mash was made up at intervals with skim-milk instead of water; but the feeding with fresh lettuce leaves appeared to be the essential factor in the improvement noticed.

The accompanying table records the result of this treatment on these fowls of different breeds, with different forms of paralysis. Among these 38 fowls there are eight which served as controls, because in seven (Nos. 5, 9, 15, 22, 32, 35, 37) gross anatomical lesions appeared complicating the symptomatic paralysis, whilst No. 1 was killed before treatment.

The rapid recovery described as occurring in Nos. 2, 3 and 4, which was effected within 48 hours, remained a singular observation. In twelve other birds the improvement was gradual, taking ten days or a fortnight to become apparent.

The ultimate figures therefore are: 15 fowls cured out of 30 suffering from paralysis. In addition, one fowl (No. 18) improved and then relapsed and is now slowly improving again; this hen has not been counted among the cured.

These results therefore confirm and extend previously published observations, for not only has the improvement lasted, but it has been complete—this in the sense that whilst at the height of the disease the fowls were thin and undersized, once treated and on their feet again, they have put on flesh and begun to grow.

Controls.—As a further proof of the beneficial effect of feeding greenstuff in fowl-paralysis, during three weeks beginning on November 1st, feeding with lettuces and skim milk was interrupted till November 22nd, though the usual mash was freely given. The result was that in three fowls, within a week or ten days, relapses of paralysis became noticeable; limping increased and gradually the birds became unwilling to walk and crouched in their pens. In the other fowls under observation a loss of condition was noticeable, but evident paralysis symptoms did not reappear. All fowls were then fed with green cabbage daily and the experiment is still being continued.

It was thought that raw lean meat might be beneficial where the lettuce brought about no improvement; therefore two paralysed fowls were fed with half-an-ounce of chopped meat each, but they died within 48 hours.

Prevention.

The preventive measures suggested in my previous paper in this journal can again be recommended in full; they consist in the first instance of judicious culling out of all weakly pullets and ailing birds in the early stages of the disease, before the paralytic symptoms have made much progress. If there is time and opportunity, hand-feeding with lettuce and baker's yeast may be tried in the acute form of neuro-lymphomatosis, but this is a laborious procedure, which may present difficulties on a commercial scale.

The wholesale slaughter of the whole flock the moment the first cases of paralysis appear, is still being recommended by some. This seems a measure which is easy to suggest, but difficult to reconcile with the existing knowledge of the pathogenesis of these conditions, which are not straightforwardly infectious, but require the action of different agencies before they develop.

Among the different conditions conducive to the development of neuro-lymphomatosis, nutritional influences appear to play a certain part. Accordingly, an alteration of the food-formula in the early stages may be indicated, with particular attention to the supply of wholesome greenstuff (this does not include rank grass). Last, but not least, the source of the strain affected must be considered and scrutinised, and if necessary avoided in the future.

It can now be stated that preventive measures on these lines have proved so far successful in one instance where they have been applied.

Acknowledgments.

The microscopical Section of Fig. VI is one in a series kindly sent me by Professor L. D. Bushnell, of Kansas State Agricultural College.

The photographs of the fowls were taken by Turners', Ltd., Cambridge. The microphotographs were made in the Molteno Institute, Cambridge, by Mr. Charles Harpley.

Anæsthetising Chickens.

Dr. Fred J. Crow, Iowa City, Iowa, who has established an enviable reputation in developing a poultry practice along with his other work, recommends the use of ether for anæsthetising chickens. His method is to pour a small quantity of ether, approximately a dram for a mature chicken, on a pledget of cotton and the patient's head is then reposed on the cotton. As soon as relaxation is effected, which takes place early, the subject's head is allowed to remain on the etherised cushion while the practitioner performs any minor operation that is of short duration. Doctor Crow recommends this method as being safe and practical with any one who is experienced in its use.—*North American Veterinarian.*

General Medical Council President.

Sir Donald MacAlister, presiding at the opening of the 134th session of the General Medical Council on November 24th, intimated that, for health reasons, he was resigning the position of President, which he had occupied for 27 years. He stated that since his illness last summer he had found that his strength was returning but slowly, and that he was less able to stand the strain of continuous sittings. He had accordingly decided, on medical advice, to ask to be relieved of the trust imposed in him by the council. The whole period of his service on the council, now extending over 42 years, had been full of interest and satisfaction. He did not intend immediately to resign his place as member, but at the close of the present sitting, at the end of the business set down for that day, he proposed to resign the president's chair, in order that, if the council thought fit, it could elect his successor.

The council afterwards elected Sir Norman Walker to succeed Sir Donald MacAlister as president.

Pullorum Disease (B.W.D.) Diagnosis.

W. P. Blount, F.R.C.V.S.

Veterinary Superintendent, Poultry Pathological Research Laboratory, Goring, Reading.

It was pointed out in an editorial in the September issue of *The Chanticleer* (*The Modern Poultryman*) that on two occasions recently pullorum disease has been diagnosed by local veterinary surgeons without a bacteriological examination. The editor concludes ". . . . the ordinary v.s. is not qualified to give a verdict in such cases, unless he has had bacteriological training and has a laboratory."

It would appear, therefore, from this, that the prestige of the veterinary profession generally will fall in the eyes of the poultry industry unless steps be taken to show that the correct diagnosis of avian diseases is an important part of a practising veterinarian's ordinary work.

Poultry disease diagnosis may be divided into two sections—(*a*) conditions which affect only individual birds, and (from the poultry farmer's point of view) of far less importance than (*b*) infectious or contagious diseases.

In view of the fact that the fate of several hundred birds may rest upon a Laboratory Report under section (*b*) it is essential that special care be taken to ensure satisfactory results.

Bacillary white diarrhœa of young chicks affects birds characteristically between the ages of five and eight days, although pullorum infection may be diagnosed not infrequently in chicks up to three weeks of age. Continental veterinarians pay far more attention to the *post-mortem* findings in this disease than do poultry investigators in this country; in fact, certain American and Dutch workers state that pullorum disease may be diagnosed regularly on *post-mortem* findings alone. Although a small percentage of cases can undoubtedly be diagnosed by this method, it is more generally recognised that a full bacteriological examination should be carried out to supplement and confirm the macroscopic findings.

It may be said that a *typical post-mortem* will in every probability reveal, by bacteriological examination, a pure culture of *S. pullorum*—so much so, that the experienced observer can suggest with remarkable accuracy that certain chicks will reveal pullorum infection.

For the benefit of those practitioners who do not frequently encounter chicks dead of bacillary white diarrhœa, the following notes may be of some value.

Clinical History.

About the second to fourth day after hatching, signs of abnormality may be noted. Chicks huddle together, some refuse food and mope about and a few die. During the next few days many more chicks will die, making a total mortality of from 15 per cent. to 80 per cent. According to the older nomenclature, white diarrhœa ought to be a characteristic symptom, but it has been shown that many chicks die from B.W.D. without evidence of diarrhœa.

Post-Mortem Findings.

The liver is friable frequently, and streaked with yellow-brown, mahogany tints. The liver capsule is not as firm and fibrous as in the healthy chick, and the substance of this gland may contain small whitish foci. If on first opening the abdominal cavity a small, soft, yellow-coloured semi-shrivelled liver is observed, or the liver is large, plump, firm and deep—even mahogany—coloured, the inference is that the chick did not die from B.W.D.

The *intestines* present no characteristic features externally, but some degree of enteritis may be noted, particularly if the large intestine is split open. The *crop* may be full of food, and the *gizzard* contents are also valueless for diagnostic purposes, although typical cases of pullorum infection sometimes present white necrotic foci (similar to those met with in the liver) which may be seen on the cut surface of the main mass of the gizzard muscles. Early writers on B.W.D. regarded a non-absorption of the *yolk-sac* as a diagnostic feature, but such retarded activity is quite definitely not specific for this, or any other disease. The feathers around the cloaca may be matted together with white deposits, but this is merely an indication of the excretion of fluid or semi-fluid faeces (droppings) *i.e.*, diarrhœa, and is not specific for pullorum diarrhœa.

The *lungs* may show characteristic changes. Simple congestion or uncomplicated pneumonia are not pathognomonic, but if pin-head to millet seed sized grey-white nodules are noted there is a strong suspicion that pullorum infection is present. The lungs should be severed from base to apex with fine-pointed scissors when, in positive cases, there may be seen easily one or several of these caseous-like rounded necrotic foci. It was at one time believed that Aspergillosis nodules were commonly encountered in the lungs when making *post-mortem* examinations on chicks, but in this country such an occurrence is infrequent and, if degenerated circumscribed areas, paler in colour and harder in consistency than normal lung tissue are encountered, it is reasonable to conclude that the animal may harbour *S. pullorum* as a septicæmic infection and not Aspergillosis. (In cases of doubt a small piece of the affected lung should be planted on Sabouraud's media. After 24 hours' incubation, if Aspergillosis is present the fungus will show itself as a profuse growth on the surface of the agar compound.)

Not infrequently chicks dead of B.W.D. exhibit abnormal *hearts*. The contour of the organ is distorted, due to infiltration of the heart muscle by mononuclear cellular elements, which appear macroscopically as relatively large, pale, tumour-like masses affecting characteristically the ventricles. Many pathologists regard this sign as almost a specific diagnostic factor, and provided there is no confusion with true tumour formation (extremely rare) it is usual to believe that such "pullorum hearts" are typical.

We find therefore in typical outbreaks of the disease that chicks die between the ages of four and 12 days, with a total mortality of more than 15 per cent. On *post-mortem* examination carcasses reveal characteristically nodulated hearts in association with necrotic lung nodules, and/or a friable, mahogany-streaked liver, possibly also infiltrated with pin-head light-coloured areas of degeneration. Such disease outbreaks may be concluded to be associated with *S. pullorum* septicæmia.

In order to confirm this (notwithstanding the fact that the experienced investigator may recognise rapidly the above-noted signs and believe in his mind that B.W.D. is present) it is necessary to demonstrate the accompanying organism concerned in pure culture and exhibit its biological characteristics. Thus:—

Flame the ventral surface of the diseased chick and by removing the sternum expose the yolk-sac, gizzard, liver,

heart and lungs, etc. The macroscopic abnormalities of each organ are usually noted as the bacteriological examination proceeds. Next sear the surface of the liver with a "spade" (an old scalpel meets the need admirably) and, with a sterile platinum loop pierce the liver surface to enter the glandular tissue. If the wire used be too thin it will bend and fail to penetrate the resistant seared liver capsule; on the other hand, if the wire is too thick much time is wasted making it red hot in the bunsen flame and also waiting afterwards for the wire to cool satisfactorily. If the platinum loop is used whilst too hot the tract created in the liver tissue is also made sterile and no growth will be obtained on the resulting inoculated media. It is usual to move the loop about inside the liver to pick up a typical piece of diseased tissue, but care should be taken not to poke *through* the organ, otherwise contaminating organisms lying in the abdominal cavity or on the gall bladder wall, etc., will be picked up. It is best, therefore, to push the loop into the organ at an angle, so that the wire runs more or less parallel to the surface and not at right angles to it. Similarly, cultures may be taken from the spleen, heart-blood, yolk-sac and lungs, though one organ is usually sufficient since the disease is a septicæmia. The nutrient media for the growth of the organism may be agar, blood agar, or peptone (or trypsin) broth. In the case of the solid media agar, either a test-tube or a petri-dish will be useful as the receptacle to contain it. Brilliant green (1 : 5,000) may be added since this acts as an inhibitor for many coliform contaminants. After 24 hours' incubation at 37·5° C. a pure culture should be obtained of *S. pullorum*, but if two or more different types of colonies are observed, subcultivation will be necessary to isolate the pullorum bacillus before further identification studies can be prosecuted.

In broth the pullorum organisms show as a light growth: on shaking the test tube faint cloudy waves may be noted—this is in direct contrast to the heavy growths of *B. coli* and other contaminants, which usually produce marked turbidity and opacity of the broth. A 24-hour growth of *S. pullorum* (recently isolated chick strain) shows as isolated, small, raised, opaque, discrete colonies; larger than the very fine pin-point colonies of certain gram-positive cocci, and very much smaller than the big, white or light-grey, heavy colonies of coliform organisms.

Having obtained a pure growth of an organism on agar (presumably resembling that of *S. pullorum*) one of the two following procedures is necessary:—

(1) *If in doubt* as to the identity of the organism make a smear, stain by Gram and if the resulting microscopical examination reveals gram-positive organisms or very large gram-negative organisms the cultures may be discarded and a report issued to the effect that B.W.D. examinations were negative. If gram-negative organisms resembling *S. pullorum* are observed on the slide, in pure culture, but there is still some doubt, inoculate from the agar a one per cent. tube of lactose in one per cent. peptone water. After 12-24 hours incubation at 37·5° C. no acid should be noted. (Litmus, Andrade's and methyl red reagents turn red in the presence of acid, whilst brom. thymol blue reagent turns yellow.) If an acid reaction, with or without the presence of gas, occurs the pullorum investigation is again terminated.

(2) If the agar culture is recognised by experience as being a pure growth of *S. pullorum*, or is known from examination (1) to be that of a gram-negative organism, the following carbohydrates should be inoculated:—lactose, maltose, dulcite, lævulose, mannite, glucose, saccharose and, in addition, litmus milk. All the carbohydrates contain Andrade's or other suitable reagent, with the exception of maltose, which should be incubated without a reagent, methyl red being added for acidity reaction as soon as incubation is completed. Twenty-four hours after incubation at the usual temperature the following reactions are typical of *S. pullorum*:—lactose, negative; maltose, alkaline (negative); dulcite, negative; lævulose, acid, gas variable; mannite, acid, gas variable; glucose, acid, gas variable; saccharose, negative; litmus milk, no change, or slight acidity.

At the same time that these biochemical reactions are initiated the remaining colonies on the agar should be washed off with about 4 c.c. of ·5 per cent. carbol-saline and agglutination tests set up with dilutions 1 : 20 and 1 : 50, using known positive serum. Two control tubes are necessary, one containing 1 c.c. antigen to which has been added ·05 c.c. of known negative serum and the second control tube contains antigen alone. The following day, after the usual incubation, complete agglutination should have occurred in the tubes containing antigen and known positive serum. The remaining tubes should be unchanged.

Finally, therefore, we find that chicks dead from acute pullorum infection may exhibit:—

(1) A suggestive clinical history.
(2) A characteristic *post-mortem* appearance, but
(3) The bacteriological examination must be pullorum positive, namely:—
(*a*) Macroscopical appearance on agar and in broth.
(*b*) Microscopical appearance when stained by Gram.
(*c*) Carbohydrate and milk reactions.
(*d*) Complete agglutination in dilutions of 1 : 20 and 1 : 50, using known positive serum.

To complete the investigation it may be necessary (in very exceptional circumstances) to inoculate live healthy susceptible chicks with the organism isolated from chicks dead of suspected pullorum disease and afterwards to recover this organism from the resulting dead chicks and demonstrate its typical serological, microscopical and biochemical characters.

Unquestionably the above findings are ideal in the diagnosis of B.W.D., but in everyday practice (through lack of time, and partly because of expense) a shortened diagnostic procedure has been adopted by certain laboratories. *The diagnosis by means of the agglutination test alone is not to be commended, because of the distinct possibility of false agglutination results occurring due to known cross-agglutination phenomena.* The least one should do in confirming an outbreak of pullorum disease is to:—

(1) Isolate in pure culture an organism from the tissues of the dead chicks giving the following criteria:—
(*a*) Lactose, maltose and saccharose no acid, but acid (with or without gas) in glucose after 24 hours' incubation.
(*b*) Complete agglutination in a dilution of 1 : 50 using positive serum obtained from hens injected with organisms *definitely known to conform* to all the biological characters of *S. pullorum* as outlined in this article.

"Lumps" or Hypopteronosis cystica in Canaries.*

Professor Tom Hare, Royal Veterinary College.

I appreciate very highly the privilege of being afforded this opportunity of describing some recent research upon the disease of canaries known to fanciers as "lumps" and to which I have given the more scientific name of Hypopteronosis cystica. We owe this meeting to the enthusiasm of the members of the Fulham and Putney Cage Birds' Society. I hope to justify all the trouble they have taken by making my brief lecture of some instructive value to an audience which I understand to be representative of the various interests of the fancy. I also wish to preface my remarks by an expression of appreciation to Messrs. H. E. King, J. H. Adams, S. Churchill, J. Hawbert, A. E. Ismay, J. Kerschbanner, H. Kendren, W. R. Miles, F. Marshall, A. Wallington and Miss F. Hine, who responded so liberally to requests for material which Mr. House was kind enough to publish in *Cage Birds*.

The instigator of my work in 1928, the one who recognised the importance of making a scientific study of the disease, was Mr. Henry Gray, M.R.C.V.S., who is distinguished in the British veterinary profession as the student of and writer on diseases in our cage birds and small furred animals. Mr. Gray tells me that he has known "lumps" in canaries for at least 30 years, and though I have not been able to obtain records of its first appearance in this country, it would appear to have a beginning at least before the present century. A few single cases have been the subject of brief reference by several continental veterinary writers during the past 20 years, and a short report of some interesting findings has been published recently from Professor Crew's laboratory in Edinburgh. Consequently I look forward with interest to members of the fancy describing in *Cage Birds* their knowledge of the first appearance of lumps in the birds of this country.

Many of you are familiar with the gross appearances of the disease and recognise that it affects birds of either sex of the plainhead, crest-bred and crest varieties. My studies have been confined to the disease in plainhead and crest-bred canaries. You have observed certain birds develop one, two, four or sometimes as many as 12 tumour-like masses beneath the skin, composed of a yellowish cheesy stuff containing immature feathers. These lumps grow from the wing, the back, the tail, the breast or other parts of the body and when they attain the size of a hazelnut or walnut may impede the movements of the bird. For many years you have been advised by Mr. Henry Gray to nick the skin over the lump, shell out its contents and cauterise the inner-lining of the tumour with a touch of silver nitrate followed by dressings of tincture of iodine. This treatment is based on sound principles, as you will learn. Many of the affected birds attempt to cure themselves. Probably many of you will have observed that an affected bird will peck away at the lump until it has removed the greater part of its contents. One of my birds removed almost the entire contents on the breast of a lump which was the size of a walnut. Unfortunately, in spite of its contents being shelled out the lump will usually regrow unless its inner lining is destroyed. At the latter operation the bird does not succeed, as a rule; consequently, at the next moult the lump regrows to its original size. It was this phenomenon connected with the inner lining of the lump that attracted my interest. It appeared to me that the clue to the mystery would be found in this lining. After many failures a solution to the problem began to reveal itself.

Possibly I can best explain this phenomenon by describing the way in which the lumps are formed, though you will understand that in the actual investigation we worked backwards from the developed lump through its various stages to its beginning.

The tiny feathers which appear in the early stages of the moult have an interesting origin. They are modifications of the skin or epidermis and thus resemble in origin the finger nails, hair, hoofs of horses' feet and the scales of birds' legs. Now a feather commences as a downgrowth of the skin or epidermal cells into the soft tissues or subcutis which lie immediately beneath the layer of skin-cells and which contain blood vessels and nerves. In fig. 1 I have represented diagramatically a downgrowth of skin cells A.A. to form a pouch B from which in the normal way a little bud of cells would grow and eventually become a tiny feather. That is to say, in the normal healthy bird the feather follicle, as the pouch B is called, retains its continuity with the skin cells A.A.

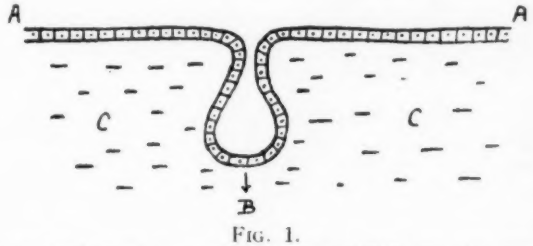


Fig. 1.
The beginning of a normal feather follicle by the growth of skin cells (A.A.), downwards in the form of a pouch (B), into the tissues beneath skin (C.C.).

The beginning of the mistake which eventually produces a lump occurs at this stage in the formation of the pouch or feather follicle. A downgrowth of epidermal cells becomes cut off from the overlying skin. Fig. 2 shows a pouch of cells B which has become isolated in the soft tissues or subcutis, beneath the epidermis, resulting in

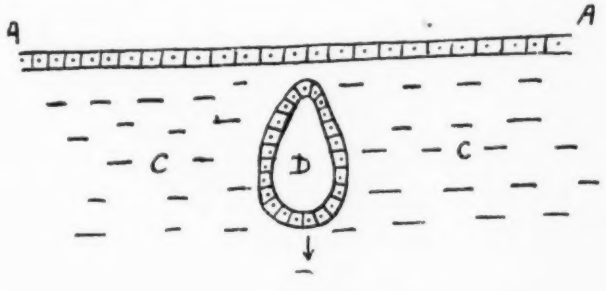


Fig. 2.
The beginning of a "lump." The pouch of skin cells (B) become detached from the overlying skin layer (A.A.), and form a cyst (D), lined by skin cells within the subcutis (C.C.).

* A public lecture delivered at Broad Street Restaurant, London, on October 28th.

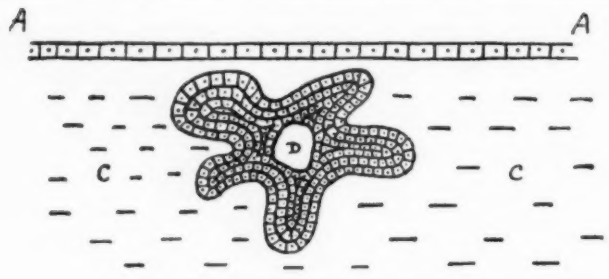


Fig. 3.
The cells lining the cyst (D) multiply and form solid masses of skin cells, which grow out into the soft tissue (C.C.). Wherever a blood vessel grows into one of these masses of cells the root of a feather is formed. Each feather grows into and enlarges the cavity (D).

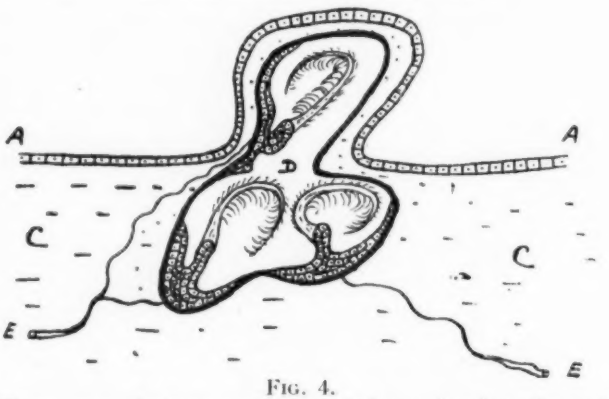


Fig. 4.
Three young feathers are represented growing into the cyst cavity (D) from their roots, each of which is supplied by a blood vessel (E). The " lump " at this stage is raising the overlying skin in the form of a rounded swelling.

the formation of a cavity lined by skin cells known as a follicular cyst, *i.e.*, a cyst of a feather follicle. Let us follow the development of this single ill-developed feather follicle. As shown in fig. 3 the cells of the follicular cyst multiply rapidly, growing out from the hollow centre as finger-like processes, each of which is made up of a solid mass of epidermal cells. The next change is the growth of a tiny blood vessel into one or more of these finger-like processes of cells. A process receiving such a blood supply then undergoes a transformation into the root of a feather. From this root a feather grows into the cavity, D, and the cavity enlarges more and more so as to accommodate the young feather. It frequently happens that several processes receive blood vessels in this manner, consequently several feathers are developed and grow into the one cystic cavity D. Thus with the growth of young feathers the cyst enlarges, and pushes the overlying skin up and up until the swelling projects from the surface of the bird's body as a tumour, the size of a millet seed, which can be recognised by the naked eye. Gradually this lump or follicular cyst containing one or, as is usually the case, several feathers enlarges to the size of a hazelnut or walnut.

Now we can return to the lining of the developed "lump" which, as I mentioned, must be destroyed by caustic in treating the lesions. Provided the lining is left behind, the cyst has every chance of reforming because it may contain cells which at the next moult will start multiplying once again and so form more and more young feather cysts. Thus by studying the lining membrane we learnt that a lump is a cyst of a feather follicle and that its formation was unassociated with the activity of any germ. In technical language, the lesion is not an infection or abscess but an anatomical maldevelopment.

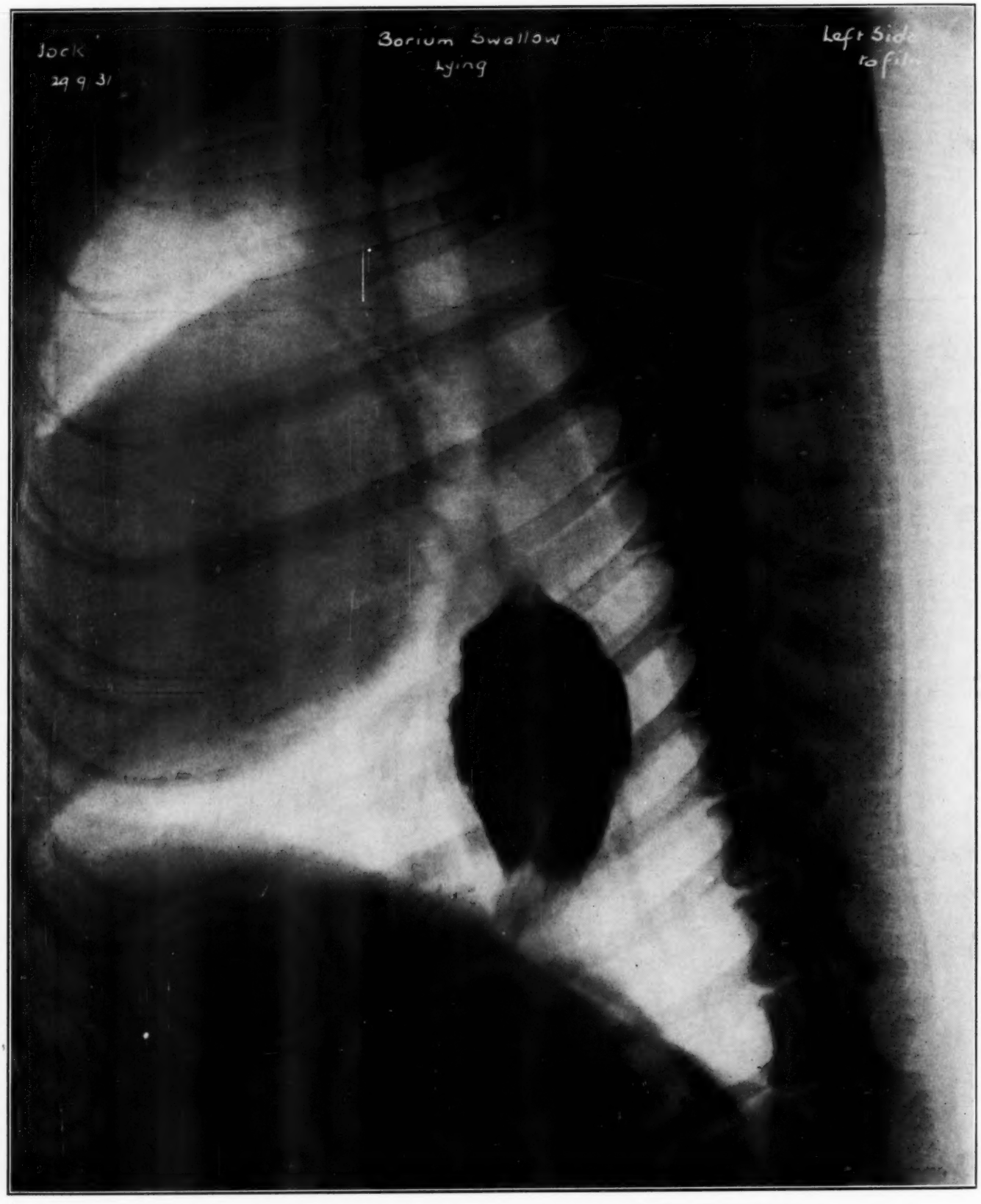
Possibly you will have been asking yourselves what makes the skin-cells in the cyst multiply actively. The explanation appears to be that these cells, like the cells of the normally developing feather-follicle, multiply in response to a chemical agent liberated by the canary's thyroid gland. We know that this agent is active at the moult and that its experimental introduction into the body will bring about a moult. Consequently, so long as the thyroid is active, *i.e.*, during the moulting period, the formation of feathers will proceed. In this connection I want to emphasise that our studies show that " lumps " first make their appearance at the moult—usually at the first moult, sometimes at the second moult, but I have no record of their arising later than the second moult. In saying this I do not want you to confuse the origin of a lump with the well-known fact that a lump, once formed, may last for several years at least. I have endeavoured to explain how that takes place.

Thus we have reduced the problem down to finding an explanation for the origin of the abnormality; or, in other words, finding what causes the cutting off or isolation of the original bud of skin-cells as represented in fig. 2. I cannot answer the question. All I can say from our studies is that this is the essential defect and that whatever its mechanism it appears to be an hereditable defect.

Mr. King very kindly permitted me to study his book, in which he has kept records of all his matings and their nests. This book was of particular value as it showed exactly what happened to the parents and their offspring of one of the birds we had studied. The history of this family, together with the histories of families kindly supplied by other fanciers, leaves no doubt in my mind that the disease is hereditable. I want you to understand that I have carried out no carefully controlled breeding experiments myself. We have had our previous attempts nullified by accidents in my animal houses, but we are hoping better luck will come from next season's observations. But while these breeding experiments, which I hope expert geneticists will perform, may eventually determine the exact nature of the hereditable defect, yet I do not anticipate their denying the truth of our present conclusion. This disease of the skin of canaries is of the same order as two hereditable diseases which I am studying now, one in dogs and the other in swine; the pathology of all three is essentially the same.

In conclusion, I would like to suggest to the fancy that it can leave scientists to carry on filling up the gaps in our knowledge of " lumps," but that meanwhile it should take action on the principal facts which have been elucidated. The task before the British fancy is to eradicate the disease, and the road it should travel is clear and straight. I unhesitatingly recommend you to destroy every bird carrying the hereditable factor of this disease.

If you intend to follow the finger-post which points to the only goal, namely to the *truth*, I do not doubt that you will find it necessary to reconsider your present methods of breeding and to readjust your show standards. But these are technicalities which can only be handled by your leading experienced fanciers and on which it would be



ILLUSTRATING CASE RECORDED BY MR. BERWYN JONES AND DR. T. B. JOBSON.

The Veterinary Record.

December 5th, 1931.

Progress in Surgery.

The advances in animal surgery during the past twenty years have been due to the demand by the animal-loving public for more efficient surgery, especially in the case of the smaller animals. Many times in a year the small animal practitioner will be asked to " save my dog, no matter what the cost." The question of pecuniary value does not enter into the matter as much as it does in the larger animals: they usually have a market value.

Much more attention is now paid to the teaching of comparative anatomy. When the horse was the chief means of transport and therefore the most important patient in the work of a veterinary practitioner it naturally followed that most of the teaching centred around that animal. To-day, as the horse is less in evidence owing to the advance of mechanical transport, it behoves us to study well the conditions which call for surgical interference in the other animals. As with the teaching of anatomy, so it is with surgery and surgical technique: veterinary surgery to-day is far different from what it was years ago. It is to be regretted that we cannot claim credit for the introduction of some of the more important operations which have come from abroad, *viz.*, Williams' operation for the relief of roaring, Forssell's operation for crib-biting, some methods of treating sterility, etc.

Professor Mitchell's address to the Scottish Metropolitan Division, published at the commencement of this issue, puts the present-day position of the surgeon very clearly. The Professor himself has done much useful and original work in the realms of veterinary surgery and his contribution towards the cause of "'shivering " in horses has suggested a new sphere for veterinary research. Veterinary surgeons have to stand on their own legs when it comes to surgical research; they have no institutes behind them to help with material and funds. What research is being done is carried out by the practitioner primarily for his own benefit, but the publication of his results benefits those who follow after.

The percentage of errors in diagnosis by the practitioner is very small, but our surgical methods are in a number of cases very crude. The erection or construction of a proper operating theatre, if only for the smaller animals, is not a very expensive matter, but how few practitioners possess one; moreover, the instruments in daily use are not always kept as they should be.

There is a tendency for physicians and surgeons to depend more and more upon laboratory help, to the detriment of the acquisition of a clinical sense which was so well marked in our ancestors when laboratory and X-ray assistance was not available. Laboratory work can never take the place of clinical observation. The surgeon stands behind all methods of diagnosis and he is responsible for the treatment. The veterinary practitioner has not the facilities, as has his medical confrère, for obtaining the services of specialists in the various branches of medicine and surgery. He is thrown more on his own resources, but he can obtain the services of a radiologist, bacteriologist and occasionally of a surgeon who specialises in a particular operation. It is his duty to his client to utilise the services of these specialists if he considers that, by so doing, he will hasten the recovery of his patient. It does not reflect on his skill to consult such men, for a practitioner cannot be an expert in every branch of his craft.

presumption for any scientist to offer advice. On the essential problem I would assure you that the members of the veterinary profession of this country will do their best to help you to keep your feet in the straight road to the abolition of " lumps."

Clinical Report.

Use of Œsophageal Tube in a Terrier.

V. Berwyn Jones, M.R.C.V.S., and T. B. Jobson, B.A., M.D., B.Ch., Guildford.

We enclose a radiograph of a Scottie dog which was brought to one of us (V. B. J.), with a history of having had queer retching attacks after food, for several weeks.

No foreign body could be palpated and no pain was evinced. After feeding with solids he would, within half-a-minute, scream with pain, and with violent retching efforts, but as a rule no actual vomition occurred. Liquids appeared to cause little trouble. Tentative diagnosis of œsophageal diverticulum, foreign body, or tumour pylorus or œsophagus or enlarged bronchial glands were hazarded. Treatment with ʒiss ol. olivæ t.i.d. produced no alleviation of symptoms; in fact, swallowing was progressively more difficult until no solids were tolerated.

At X-ray examination (conducted by Dr. D. A. Imrie, of Guildford), a diverticulum was negatived by the fact that the paste shadow was dorsal to the œsophageal line; whereas, had it been present, one would have expected gravity to have drawn it ventrally.

" The lower end of the œsophagus," stated Dr. Imrie in his report, " was much dilated, and the irregular appearance produced by the thick paste at this site very strongly suggests the probability of some impacted food or bone."

The foreign body was a small vertebra of a sheep and was removed by means of an œsophageal tube, with the patient under deep chloroform anæsthesia. The patient made an uninterrupted recovery.

REPORTS.

Bovine Tuberculosis in Man

With Special Reference to Infection by Milk.*

Ministry of Health Memorandum.

[The memorandum is prefaced by the following note by the Chief Medical Officer of Health, Sir George Newman :—

" On February 6th, 1930, Colonel Fremantle, M.P. (St. Albans), asked the Minister of Health ' if, with a view to effective co-ordination of effort to prevent the spread of bovine tuberculosis from cattle to man and to promote the consumption of milk, he will issue, for the guidance of the public, a review of the main facts, experience, and conclusions on which action should be based.' The Minister acceded to this request and promised, as soon as circumstances allowed, a brief memorandum on the subject, and this has now been prepared in the Medical Department of the Ministry. It is issued to the public as a general outline of the position in this country regarding the incidence of tuberculosis and the proportion due to bovine infection, the incidence of tuberculosis in cattle and the estimated percentage of milk from those animals proving tuberculous, together with a consideration of the available known measures which can successfully be adopted for mitigating or preventing the infection of consumers of such milk with the bovine bacillus. Such a memorandum is not intended, of course, to provide a full statement of all our knowledge of the subject of tuberculosis and milk, which would require a lengthy period of preparation. But it does contain a conspectus of information designed to enable the reader to appreciate the needs of the situation and the difficulties of meeting it, which are by no means free from both practical and scientific involvements."]

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Introduction.

The purpose of this memorandum is to set forth as briefly as possible the information at present available on this subject, together with a short review of the measures so far taken, especially in this country, to prevent the spread of tuberculous infection from cattle to man.

It is obviously impossible in a short memorandum to reproduce the evidence supporting the various statements made, but care has been taken to differentiate between contentions which are generally admitted by workers having a special knowledge of the subject and those more doubtful points which are still the subject of controversy.

In order to understand the problems involved and to appreciate the difficulty of obtaining reliable information with regard to the amount of human tuberculosis in this country attributable to infection of bovine origin, it is necessary to have some knowledge of the natural history of the infecting organism and of its behaviour when introduced into the bodies of cattle and of human beings. For the present purpose it may suffice to restate some of the facts which have now been firmly established, largely by the labours of the Royal Commission on Tuberculosis (1904-1911).*

Tuberculosis in animals and in man is the same disease, that is to say the pathological changes found are always of exactly the same nature, though they may vary in degree, and the organisms causing them resemble each other so closely in their morphology, cultural characters and pathological effects that they must be regarded as varieties of the same species rather than as distinct organisms. It is, however, possible by observing the cultural peculiarities and pathogenic properties of the organisms concerned to distinguish at least three definite types or varieties, known as the human, bovine and avian, from the frequency with which they are isolated from cases of the disease in man, cattle and birds, respectively. For the purpose of this memorandum it is important to distinguish between the human and the bovine varieties and this distinction is made possible by two facts, namely: (1) that the human bacillus grows more luxuriantly than the bovine type on certain media, the addition of glycerin to the medium favouring the growth of the former and impeding or leaving unaffected the growth of the latter; and (2) that the bovine strain is much more virulent for certain animals (*viz.*, bovines, pigs, rabbits, etc.), than the human strain. For instance, the bovine strain sets up acute and generalised tuberculosis when 0·01 mg. of a culture of the bacilli on a solid medium is injected intravenously into rabbits; this effect is not produced by the same dose of the human bacillus.

In spite of these differences between the human and bovine varieties of the tubercle bacillus, it has been amply demonstrated that man can be infected with the bovine, as well as with the human, type of the tubercle bacillus, and, in fact, many fatal cases of tuberculosis in man are due to infection with the bovine variety of the organism. It is in children especially that the bovine bacillus is found, and there is no doubt that a considerable amount of the tuberculosis of childhood is due to infection with bacilli of this type conveyed in milk from tuberculous cows. The extent of this infection will be discussed later.

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I.—The Incidence of Human Tuberculosis in England and Wales.

It is not possible to form an exact estimate of the incidence of human tuberculosis in this country from the figures for notified cases, which, however complete, do not take account of duplications and omissions; at the same time it is generally admitted that notification of the disease has undergone much improvement in recent years. Many new cases, moreover, come to the knowledge of Medical Officers of Health otherwise than by formal notification, and these additional cases are included in the figures for the years from 1923 onwards, given below, causing an apparent increase in the incidence of the disease. The following table, therefore, gives only an approximate idea of the incidence of tuberculosis in England and Wales.

* Reports on Public Health and Medical Subjects, No. 63. Published by His Majesty's Stationery Office, London, 1931. Price 6d. net.

*See also " Tuberculosis in Man and the Lower Animals," by H. H. Scott, Medical Research Council, Special Report Series No. 149, H.M. Stationery Office, 1930.

Table I.
England and Wales.

Year.	New Cases of Tuberculosis. Pulmonary.	Non-pulmonary.	Total all forms.
1913	80,788	36,351	117,139
1914	76,109	23,388	99,497
1915	68,309	22,283	90,592
1916	68,109	22,799	90,908
1917	68,801	20,884	89,685
1918	71,631	18,942	90,573
1919	61,154	16,357	77,616
1920	57,844	15,488	73,332
1921	56,334	15,368	71,702
1922	53,422	15,837	69,259
1923	59,172	20,216	79,388
1924	60,747	20,411	81,158
1925	60,770	20,667	81,437
1926	59,520	20,134	79,654
1927	58,109	19,781	77,890
1928	57,682	20,199	77,881
1929	57,274	18,682	75,956

The mortality figures for the disease are set forth in Table II below.

Table II.

Year.	Deaths from Tuberculosis of the Respiratory System. Males.	Females.	Total.	Deaths from other forms of Tuberculosis. Males.	Females.	Total.
1911 ...	21,594	16,828	38,422	7,633	7,065	14,698
1912 ...	21,158	16,111	37,269	6,648	6,134	12,782
1913 ...	20,601	15,602	36,203	7,056	6,217	13,273
1914 ...	21,417	16,421	37,838	6,659	5,801	12,460
1915 ...	23,167	17,636	40,803	7,178	6,314	13,492
1916 ...	22,850	17,919	40,769	6,876	6,213	13,089
1917 ...	23,276	19,059	42,335	7,083	6,516	13,599
1918 ...	24,371	20,967	45,338	6,656	6,079	12,735
1919 ...	19,248	16,736	35,984	5,302	5,026	10,328
1920 ...	17,872	14,919	32,791	5,046	4,708	9,754
1921 ...	18,121	15,384	33,505	4,778	4,395	9,173
1922 ...	18,656	15,263	33,919	4,660	4,198	8,858
1923 ...	17,571	14,526	32,097	4,514	4,177	8,691
1924 ...	17,970	14,720	32,690	4,380	4,033	8,413
1925 ...	17,995	14,387	32,382	4,239	3,766	8,005
1926 ...	16,773	13,335	30,108	3,896	3,521	7,417
1927 ...	17,184	13,882	31,066	3,732	3,375	7,107
1928 ...	16,608	13,191	29,799	3,549	3,275	6,824
1929 ...	17,786	13,639	31,425	3,500	3,065	6,565

The gross death rate in 1929 for all forms of tuberculosis was 959 per million, that for respiratory tuberculosis being 793, and for other forms of the disease 166. Although the figures for 1929 are somewhat higher than those for 1928, as regards respiratory tuberculosis, there has been a general trend downwards during the last twenty years—the deaths from non-pulmonary forms of tuberculosis in 1929 being less than half of those for 1911.

However encouraging these results may be, the loss of life from this disease (not to mention the invalidity) is still a very serious matter, and the concentration of every effort in the campaign against tuberculosis is of the greatest importance.

II.—Proportion of Cases attributable to Infection of Bovine Origin.

The estimation of the proportion of cases due to infection of bovine origin is a difficult matter.

In the opinion of most experienced workers the possibility of the gradual modification of bacilli of the bovine type in the human body until they manifest all the characters typical of the human variety is so remote as to be negligible for all practical purposes. It may be assumed, therefore, that the discovery of bacilli of the human or bovine type in any case of tuberculosis gives a fairly accurate indication of the origin of the infection. The bacteriological work involved in the isolation of the infecting organism and the determination of its type, is, however, considerable, and although many workers have undertaken this task and the total number of cases which have thus been classified is large, it cannot yet be stated with accuracy what proportion of the deaths in each variety of tuberculous disease is due to the bovine bacillus. The most extensive work in this direction, as regards Great Britain, has been carried out by Dr. A. S. Griffith, who has kindly supplied the following table, which includes his latest results.

Table III.

Variety of Tuberculosis.	No. of Cases.	Percentage of cases infected with Bovine type of tubercle bacillus. 0-5 yrs.	5-15 yrs.	All ages.
Cervical Gland ...	133	84·0	51·5	48·9
Lupus	168	62·5	53·2	52·4
Scrofulodermia ...	59	50·0	43·2	35·6
Bone and Joint ...	541	29·4	18·6	18·7
Genito-Urinary ...	23	—	—	17·4
Meningitis	33	33·3	35·0	27·3
Pulmonary	795	—	—	2·6
Post-mortem Cases	183	29·7	14·3	22·3

In this table all the figures, excluding those for the *post-mortem* cases, refer to cases in which the organism whose type was determined was found in material obtained from the patient during life. Thus, in the cervical gland cases the bacillus was obtained from glands removed at operation or from pus taken from suppurating glands; and in the meningitis cases the bacillus was found in the cerebro-spinal fluid drawn off by puncture. These figures therefore refer to the incidence of the bovine infection and not to mortality from this cause, and if these cases represent a fair sample of the total cases in the country (as is probably approximately true) then a large proportion, and in some varieties as much as a half, of the tuberculous disease in children under 15 is caused by the bovine type of the bacillus. It will be observed that there is little or no evidence of bovine infection producing pulmonary tuberculosis in children.

III.—Incidence of Tuberculous Disease in Cattle.

1. *Results of Tuberculin Test.*

As many estimates of the prevalence of tuberculous disease in cattle are based upon the results of tuberculin tests, it may be as well to say a word here with regard

to the significance of this reaction in bovine animals. A positive reaction in a bovine may be accepted as evidence that the animal is infected with the bacillus of tuberculosis. The test is a qualitative and not a quantitative one; it thus gives no indication of the degree of infection present, except that heavily infected animals may not react to the test; in such cases clinical manifestations are almost invariably present. So great is the risk of the spread of tuberculosis in a herd from a reactor to the tuberculin test that for practical purposes such reactors are to be regarded as infective. By reason of the susceptibility of bovine animals to tuberculosis an infected animal, if allowed to survive long enough, would almost always go on to a condition of active progressive tuberculosis.

There are two mains forms of tuberculin test, *viz*:—(1) The Subcutaneous Test, *i.e.*, a temperature test following on the hypodermic injection of a measured quantity of tuberculin, and (2) The Intradermal Test, *i.e.*, a clinical estimation of the swelling produced by an injection of tuberculin into the skin.

The Tuberculin Committee of the Medical Research Council found that the subcutaneous test, although satisfactory when carried out with the exactitude of a laboratory experiment, was untrustworthy under ordinary farm conditions, and difficult of interpretation. Accordingly they devised a modification of the intradermal test, known as the Double Intradermal Test, the accuracy and reliability of which under ordinary farm conditions have been amply proved.* This test has recently been made obligatory by the Ministry of Health and by the Department of Health for Scotland in the case of herds licensed for the production of Certified Milk and Grade A (T.T.) Milk.

Until the tuberculin test has been applied on a large scale any estimates of the incidence of tuberculous disease in cattle based upon the results obtained by it must be accepted with caution. In the first place there is reason to believe that the incidence of the disease varies very considerably in different localities; and in the second place the reports available relate principally to milch cows, which are more prone to be tuberculous than young cattle and other bovine animals. In these circumstances it is not surprising to find that the percentage of reactors in different investigations has varied within wide limits; 40 per cent., however, would probably be accepted as an average figure for milch cows.

2. *Abattoir Statistics.*

Another source of information is furnished by the results of slaughterhouse examinations. In 1929, at the Metropolitan Cattle Market, Islington, 51 per cent. of the cows slaughtered were found to be tuberculous. In Edinburgh the corresponding figures for 1926 and 1927 were 46·5 per cent. and 42·99 per cent., respectively, but the majority of the cows were affected with the disease to a minor extent only. Such returns as these depend, of course, upon a variety of factors relating to the reasons for slaughter.

3. *Clinical Cases detected by Routine Veterinary Inspection.*

The routine inspection of cattle, especially if combined with biological tests of the milk, gives very valuable information as to the proportion of cattle infected with tuberculosis, but unfortunately such inspection is at present carried out in a few areas only. The results which are obtained give some idea of the number of so-called "open" cases of tuberculosis in the area, but afford little indication of the total amount of tuberculous disease present. It is, however, the "open" cases which are of chief importance in estimating the danger to man from this infection, but it must be remembered that in many cases the veterinary inspection of a herd is undertaken in consequence of the discovery of tuberculous milk and the animals whose examination is recorded are to this extent selected. Savage has collected figures from various English and Scottish County Authorities, carrying out routine clinical inspections of cattle in which the percentage of tuberculous animals so detected varied from 0·22 to 1·77 of the animals examined, and that of cows with udder tuberculosis from 0·10 to 0·40.

4. *Proportion of Cows Suffering from Tuberculosis.*

What then is the prevalence of bovine tuberculosis in this country? In 1921 M'Fadyean estimated that of breeding animals from three years upwards not less than 30 per cent. were tuberculous, and that for the principal milking breeds the figure should probably be nearer 40 per cent. These estimates may be regarded as moderate, and the real proportion is probably considerably higher. Not all of these cows are, of course, yielding tuberculous milk, but since the disease is progressive they might be regarded as ultimate sources of such milk if they survive long enough.

IV.—Tuberculous Milk.

1. *Milk as a Vehicle of Infection with the Bovine Bacillus.*

Reference has already been made to the part played by raw milk in the transmission of tuberculosis to children. The evidence now available makes it practically certain that this is the main vehicle of infection with the bovine bacillus and, as will be shown in the next section, the opportunities for infection from this source are unfortunately frequent. Bovine infection is commoner in children than in adults, and there is reason to believe that the intestinal defensive mechanism is less developed in childhood, which is also the period when more milk is drunk, than in later life. Although there can be no doubt that the chief portal of entry in alimentary infection is the intestine, there is evidence to indicate that the tonsils not infrequently play this rôle.

Estimates of the prevalence of tuberculosis in cattle give some indication of the danger of human infection by bovines; but, as has already been remarked, the chief source of infection is milk containing the tubercle bacillus, so that an estimate of the frequency with which cows yield such milk is of the greatest importance.

2. *Proportion of Cows yielding Tuberculous Milk.*

It has been pointed out above that at any given time cows with tuberculosis are not all yielding tuberculous milk, and in order to estimate the proportion of cows which are doing so it is important to have information with regard to the prevalence of tuberculous disease of

**Vide* "Tuberculin Tests in Cattle with Special Reference to the Intradermal Test." Medical Research Council. Special Report Series No. 94, H.M. Stationery Office, 1925, and "The Intradermal Tuberculin Test in Cattle—Collected Results of Experience." J. B. Buxton and A. S. MacNalty, Medical Research Council. Special Report Series, No. 122. H.M. Stationery Office, 1928.

the udder. This is extremely difficult to assess as it is often impossible to detect such disease clinically, and in the early stages of the infection the milk may contain tubercle bacilli and yet the udder may be unaltered in appearance. It is generally admitted that primary udder tuberculosis is extremely rare, and in something like 50 per cent. of the cows found to be tuberculous on slaughter the disease is generalised in the body. Tuberculous mastitis is much commoner in older cows than in quite young animals, and it is possible that the disease is encouraged by the artificial stimulation of the mammary gland and the unnatural demands made upon it by milking. Slaughter-house statistics and the routine inspection of cows by veterinary surgeons, such as is carried out in certain parts of the country, give an incidence of something under one per cent. for tuberculous mastitis, but some observers believe that the true figure for the whole country is considerably higher. Savage, however, considers that the older estimates (*e.g.*, M'Fadyean, 2·0 per cent.; Stockman, about 2·0 per cent.; Dewar, over 1·2 per cent.) are probably too high. The Ministry of Agriculture and Fisheries conclude, from the information at their disposal, that probably from 1 to 1·5 per cent. of cows in herds in which the disease has been discovered under the operations of the Tuberculosis Order and the Milk and Dairies Acts yield tuberculous milk.

Where strict cleanliness is not practised, milk from healthy cows may become infected with tubercle bacilli from the milkers or from contaminated manure, fodder or dust.

3. *Proportion of Milk infected with the Tubercle Bacillus.*

The proportion of tuberculous milk in any area will depend very largely upon the extent to which the milk is mixed or "bulked" before distribution, and it cannot, therefore, be taken as an index of the proportion of tuberculous cows in the herds supplying the area. Nevertheless, a consideration of the results of the bacteriological examination of mixed milk samples is of some interest as giving an idea of the frequency with which market milk is infected with the tubercle bacillus. Savage has collected records of such examinations from the annual reports of medical officers of health, and these are set out in the table below.

Table IV.

Percentage of Milk Samples found to be Tuberculous during the period 1922-27 *inclusive.*

Town.	No. of milk samples examined.	No. of samples found to be Tuberculous.	Percentage Tuberculous.
Liverpool	4,942	350	7·1
Aberdeen	955	53	5·5
Salford	1,871	139	7·4
Birmingham ...	3,220	244	7·6
Newcastle-upon-Tyne	1,693	85	5·0

As regards Birmingham and Newcastle-upon-Tyne, where great attention is paid to milk problems, Savage remarks that the samples are truly representative of the raw milk going into the town, so that the difference in the proportion of samples found tuberculous probably represents a different proportion of cows secreting tuberculous milk in the rural areas supplying these two towns. Naturally figures for areas in which pasteurisation is carried out before the milk is distributed will only give a true idea of the incidence of tuberculous infection in the milk if the samples are collected before pasteurisation has been carried out. In Manchester during 1929 a total of 1,133 samples of milk were examined for tubercle bacilli, of which 111 (*i.e.*, 9·8 per cent.) gave positive results. The examination of mixed milk samples from 697 country farms during the same period showed that 88 of these farms (*i.e.*, 12·62 per cent.) were sending tuberculous milk into Manchester. The corresponding figure for London in 1929 was 7·5 per cent.

(*To be continued.*)

Research into Swine Diseases.

Report to the Minister of Agriculture and Fisheries by the Pig Industry Council.*

The Pig Industry Council is satisfied that the progress and development of the pig industry in this country is retarded to an appreciable extent by reason of the very considerable losses that are either directly or indirectly associated with disease. Serious dislocation of markets is often caused by a glut of immature pigs sent in and slaughtered because of local outbreaks of various pig diseases. In this connection it should be noted that, apart from the losses from those diseases for which no complete statistical records are available, the deaths due directly to swine fever amounted in 1928 to 17,566 and in 1929 to 50,181.

The Council is of opinion that measures should be taken to reduce such losses to the lowest possible limit, and would emphasise that this action would not only prove of financial benefit to the individual owner but would also tend to establish that confidence in this branch of animal husbandry which is so essential for its progressive development.

The Council has given most careful consideration to the means whereby this objective may be attained, and is convinced that the immediate needs of the industry in this connection require:—

(i) Continuous and intensive research into the diseases of the pig.
(ii) The establishment of a scheme which will ensure that the veterinary profession and the industry may promptly acquire information of the progress of research so that the most modern methods of prevention, diagnosis and treatment may be adopted.
(iii) The state control of sera and vaccines used for the prevention or treatment of pig diseases in order to ensure that such products are potent.

Research.—Apart from the upkeep of the Veterinary Laboratory of the Ministry of Agriculture and Fisheries at Weybridge, which is primarily concerned with the diagnosis of various diseases scheduled under the Diseases of Animals Acts, the principal grants allotted for research into animal diseases for the year 1929-30 were approximately as follows:—

Institution.	Subject.	Grant.
		£
Cambridge University ...	Animal Pathology	10,700
Cambridge University ...	Protection of Calves against Tuberculosis by vaccine ...	375
Royal Veterinary College ...	Animal Pathology	5,150
Liverpool University ...	Pregnancy Disease of Ewes ...	200
Ministry of Agriculture and Fisheries (Foot-and-mouth Disease Research Committee)	Foot-and-Mouth Disease ...	15,000

*Reproduced from *The Journal of the Ministry of Agriculture*, Vol, xxxviii, No. 6, September, 1931.

A grant of £5,200 is made to the London School of Tropical Medicine for parasitology research, but it has been ascertained that no specialised research regarding the parasites of the pig is being carried out.

Apart from the Veterinary Laboratory at Weybridge and the School of Tropical Medicine, the grant for research into animal diseases is approximately £30,000 a year. Of this sum £15,000 is utilised exclusively for foot-and-mouth disease research, whilst a considerable proportion of the remainder is expended on research into tuberculosis and other diseases. The sum available for research into specific diseases of swine must, therefore, be very small.

According to the evidence which has been obtained, it appears imperative that investigation into the diseases and parasitology of the pig should be commenced without delay.

Diseases which are causing the most serious losses at the present time are swine fever, swine erysipelas and certain diseases of the unweaned pig. It is our opinion that special attention should be given to these with the object of ascertaining improved methods of prevention, diagnosis and treatment.

Location of Research Station.—The Council is of opinion that the proposed research into the various pig diseases should be concentrated at one centre instead of being allotted to various research stations; it is nevertheless hoped that in exceptional cases grants for specific research will be available for allocation to other Institutes, if adequately equipped and staffed to undertake research into specific diseases of the pig.

It is considered desirable to emphasise the first and major half of this recommendation, partly because much of the proposed work is correlated and partly because such an arrangement will enable staffs, buildings, etc., to be utilised in the most economical manner. The station should be attached to one of the existing centres of research rather than be established as an entirely independent unit. This will enable full and economical use to be made of the existing workers specialising in pathology, helminthology, etc., and thus avoid unnecessary duplication and overlapping of these posts which would result if an independent station were established.

After taking all factors into consideration it is recommended that the proposed research station should be located at the existing establishment at New Haw, Weybridge, Surrey.

Among the reasons which influenced the Council in this decision are the following:—

(*a*) The premises are better equipped for this particular research than those of any other existing Institution.

(*b*) There are approximately 100 whole-time and 266 local veterinary inspectors (part-time) employed by the Ministry, and these are required to submit morbid material for examination in connection with swine fever, swine erysipelas, etc., to the Ministry's Laboratory at New Haw. Apart from the great utility of such material in connection with research, it is considered that this field staff would prove of the greatest value as a means of liaison between the research station, the veterinary practitioner and the pig owner.

Staff.—It is not proposed to make recommendations as to the staff other than to suggest that there should be a technical officer specially detailed for research into pig diseases, who, although acting under the control of the Director of Research, should nevertheless be responsible for the co-ordination of research work on pig diseases, for dealing with correspondence relating thereto and for keeping in touch with the needs of the pig industry with regard to the various disease problems.

The Establishment of a Scheme whereby the Results of Research may be made known to the Veterinary Profession and through it to the Industry.—It is recognised that the usefulness of research will be considerably decreased unless the veterinary practitioner, veterinary advisory officer, county agricultural organiser and the pig owner can be kept informed as to the progress made. It is considered that difficulties in this connection might be overcome by:—

(i) The circulation of articles in both the professional and lay Press, the former dealing with the subject from the scientific point of view and the latter in popular terms.

(ii) The provision of facilities to the veterinary profession to visit the research station at will, and to witness demonstrations regarding improved methods of diagnosis, treatment, etc.

(iii) The constant communication to the Ministry's whole-time veterinary inspectors and the veterinary advisory officers of information as to any progress made, preferably by means of short courses of instruction, in order that they may be able to act in a consultant capacity if required by a veterinary practitioner.

(iv) The furnishing of all possible assistance by the research station, through consultation or otherwise, to veterinary surgeons who may be in doubt regarding any disease of swine.

It is considered that by these methods an increasing number of veterinary surgeons will be stimulated to take a greater interest in swine diseases.

The State Control of Sera and Vaccines normally available for the Prevention or Treatment of Disease.—The Council has noted the divergence of opinion regarding the utility of the various sera and vaccines which are on the market at the present time. It has been ascertained that a large quantity of the sera and vaccines used in this country are produced abroad, and it appears possible that the varying results obtained may be due, in part, either to the fact that a proportion of the sera and vaccines are not potent against the types of disease present in this country or to deterioration from various causes prior to administration.

It is obvious that any progress made in improved methods of prevention and treatment will be nullified to a large extent unless biological products of adequate potency are available. It is, therefore, advised that the State should adopt measures of control to ensure that only sera and vaccines of approved potency should be offered for sale, and that these should be available at the lowest possible cost.

It is recognised that certain types of vaccines are capable of causing serious losses if employed by inexperienced persons; it is accordingly suggested that these should be available for use only under the direction or control of a qualified veterinary surgeon.

Summary of Recommendations.—The Pig Industry Council recommends to the consideration of the Minister:—

(1) The establishment of a central station where continuous and intensive research regarding the diagnosis, prevention and treatment of pig diseases may be carried out.

(2) The introduction of some system whereby the veterinary profession and the pig industry may be made acquainted from time to time with the progress of research.

(3) The control of sera and vaccines with the object of maintaining their standard of potency for the treatment or prevention of diseases for which they were devised.

Radnor, *Chairman.*

March 14th, 1931.

It is surprising that many farmers are still disinclined to recognise the potentialities of organised pig production. They cling to the idea that pigs are as uncertain as money-makers as they are uncleanly in habits. Both beliefs are unworthy of retention. Properly housed and cared for, the pig offers as good a return on capital outlay as any animal on the farm.—*Scotsman.*

County of Durham Veterinary Department.

This is the first Annual Report presented by Major Peele, and he has given a concise account of conditions in the county relating to the scheduled diseases of animals and the methods of milk production.

The county has been divided into four areas and an assistant placed in each, with one assistant at headquarters. A new feature in this report is that after completion of routine inspection in each district a summary report is furnished by the Veterinary Officer and extracts of these are included in the Annual Report. These show the various conditions met with in the different areas after the completion of their first visits and what improvements are necessary. The method of inviting the Sanitary Inspectors of different authorities to visit with the Veterinary Officer is very good and excellent results are to be expected from this co-operation and from the assistance given to the Sanitary Inspectors in providing travelling facilities and getting more attention paid to scattered dairy premises. The health of the cattle will also benefit from better housing and greater care exercised generally.

There are 15 licensed producers of Grade A milk, one for Grade A (T.T.), and two for Certified milk in the county, and the report states that "The institution of a whole-time veterinary service has undoubtedly already led to a marked improvement in the general administration of the Milk and Dairies Acts and Orders throughout the county, and has, moreover, resulted in a most satisfactory rise in the standard of purity of the milk supply, although much work yet remains before a sound and wholesome milk free from all impurities calculated to endanger the public health can be ensured."

The report gives the number of visits carried out in routine inspection to farms as 3,482, and 31,685 as the number of cows examined. One hundred and twenty-eight animals were slaughtered under the Tuberculosis Order, classified as follows:—tuberculosis of the udder 68, tuberculous emaciation 13, other forms of tuberculosis 47—a percentage of 0·21 with tuberculosis of the udder and 0·40 with all forms of tuberculosis. Other examinations of reported animals were carried out and 94 animals dealt with under the Order which were reported by owners and 67 by veterinary practitioners, making a total of 289 animals slaughtered.

These figures are very interesting, showing, as they do, that the owners and veterinary practitioners are complying with their obligations under the Order.

A comparison of the animals dealt with under the Order in 1928, 1929 and 1930 shows an increase each successive year with an increasing percentage of tuberculous udders dealt with. These figures are accompanied by graphs which add great value to a report of this nature.

Furthermore, a table is included showing comparative percentages of the number of animals with tuberculosis of the udder or giving tuberculous milk slaughtered under the Order for Great Britain and the County of Durham in 1920, and it is noted that these percentages are 19·4 and 43·6 respectively of the total animals dealt with. Greater care taken in the classification of the animals in their correct schedules under the Order may account to some extent for this difference, but there is positive proof in this report that routine inspection discovers a large number of cows suffering from tuberculosis of the udder.

Details are given of the administration carried out under the legislation relating to the other scheduled diseases, one case each of anthrax and parasitic mange, and ten cases of swine fever being confirmed. There are 15 markets in the county and 10 cases of suspected tuberculosis and one case of suspected swine fever were found in these. Nine of the former were found on further examination to be amenable to the Tuberculosis Order.

Meat inspection is carried out by the local sanitary authorities and Major Peele regrets that in very few instances was advantage taken of the services and special training of the staff for consultation. This would be very much altered if suitable legislation were in force, as in Scotland, and let us hope that the work upon which the Veterinary Official can rightly claim to be an authority will soon be universally under his control.

The report is another instance of what efficient administration of a County Council's duties under the Diseases of Animals Acts and other Acts and Orders can accomplish.

Major Peele is to be congratulated upon his results. Towns and cities dependent upon the County of Durham for their milk supply can be satisfied that their interests are being guarded, and this report shows that it should be imperative for all County Councils to have routine inspection of dairy herds carried out under the Milk and Dairies Acts and Orders. W. T.

Agricultural Research and Education.

The report on the work of the Research and Education Division of the Ministry of Agriculture for the year 1929-30 (H.M. Stationery Office, 1s. 3d. net), points out as a remarkable fact that, in spite of the agricultural depression, the number of students at the agricultural colleges was maintained. No fewer than 1,896 students attended institutions of higher agricultural or veterinary education, of whom rather more than half took agricultural courses; the remainder were spread over veterinary science, horticulture, dairying, and poultry husbandry. In many cases there was an increase over the figure for the previous year.

The report states that dairy farmers generally are eager to make every possible improvement in their methods for the production of milk and milk products. Although the period under review was one of great difficulty, definite progress was made. It was most marked in the raising of the hygienic standard of milk supplied for consumption, probably because educational activities have for some time been directed towards that end.

The fact that twice as many eggs are being produced in this country now as in 1913 is quoted as proof of the remarkable growth of the poultry industry since the War. The annual value of this increase in production is estimated at over £7,000,000; the annual value of the total egg production (in 1929) was over £17,000,000. There can be no doubt that the schemes of poultry education and research which have for many years been maintained by the Ministry and by county authorities for agricultural education have contributed largely to this result. No one who is familiar with rural conditions can have failed to be impressed by the greatly increased interest that is taken everywhere in poultry-keeping as a profitable branch of agriculture. In spite of the rapid development of the industry during recent years, eggs in shell were imported in 1930 to a value of £16,390,735, and table poultry to a value of nearly £3,000,000. There is still ample room for development in the poultry industry of this country.

Abstracts.

[**Anti-tubercle Vaccination by B C G. Can B C G resume Virulence?** Moussu, M. *Recueil de Méd. Vét.* Vol. 107. No. 8.]

While the promoters of the method B C G consider that they have solved the problem of protection against tuberculosis in man and bovines, the author, basing himself on experimental facts, has thrown doubt on the efficacy and innocuity of the procedure.

The efficacy of B C G as applied to man is, from the point of view of experimental pathology, rigorously disputed. The scientific solution of the problem belongs to veterinary medicine and particularly to bovine pathology.

As the first method of vaccination by B C G was not attended by satisfactory results, it was modified in 1927, since when the time elapsed is too short to draw conclusions of practical value, more especially as the observations were made in breeding establishments protected from criticism in case of non-success. The question of the efficacy or non-efficacy is, then, not yet settled—all the less when unfavourable reports have been met with the objections: too long contamination, over-infection, carelessness in operating. Since the regretable results of human anti-tubercle inoculation at Lübeck, scientific discussion has been rather on the unsuitability of B C G and its renewal of virulence than on its protective efficacy. Morphological and physiological fixity in cultures may be admitted, but further assurance is needed when a living vaccine is introduced into a living organism susceptible to tubercle—in a culture medium of very different composition than that from which it originated. Will the bacillus of the vaccine in the organism preserve its preventive qualities; will it modify them or acquire new ones; will it, in fact, renew its virulence? This problem still awaits solution.

Says M. Moussu:—On March 10th, 1931, a Dutch heifer, 18 months old, was examined by me. She presented at the base of the neck a growth deeply attached to the muscles below. The veterinarian, M. Arkwright, had hesitated to operate. The subject was on a dairy farm which had been progressively freed from tubercle among the animals by means of tuberculin. Later, to avoid return of the malady, vaccination by B C G had been carried out.

In March, 1931, there were on the farm two groups of animals—ten cows not vaccinated and a second group of vaccinated animals.

The heifer with the so-called cyst was born October 1st, 1929, vaccinated with B C G at 10 days old and re-vaccinated October 25th, 1930. While never ill, the calf did not develop as well as its fellows. Growth on neck noticed in September, 1930, eleven months after vaccination. The growth developed rapidly and was removed in March, 1931. It was a cold abscess with fibrous walls and fluctuating centre and weighed about four pounds. Two guinea-pigs received subcutaneous inoculation of emulsion from caseous material contained in areas in the fibrous wall and both died in two weeks, and on *post-mortem* both showed tuberculous lesions of liver, spleen and lung; the seat of inoculation swelling, but no ulceration. Fragments of liver and spleen of one of the subjects inoculated to two other guinea-pigs gave local lesions characteristic of evolution of tubercle. Has this observation need of long commentaries? The author thinks not.

In good logic it seems reasonable to think that the non-virulent living vaccine inoculated in October, 1929, has become virulent with time and has ended in giving rise to a tuberculous cold abscess. The problem of anti-tubercle vaccination does not seem solved by B C G; the future will say what should be attributed to it and with what it should be reproached.

W. R. D.

[**Anti-tubercle Vaccination by B C G. Can B C G renew Virulence?** Calmette and Guérin. *Recueil de Médecine Vétérinaire,* Vol. 107, No. 9.]

M. Moussu, in the *Recueil* of August, 1931, poses the problem (as he says, not yet settled) of the innocuity of B C G in the organism of bovines and he answers it in the negative and justifies his position by a personal observation. This relates to a heifer inoculated at birth and which at eleven months presented at the base of the neck a cold abscess proved to be tuberculous by inoculation. To show that this was a case of renewal of virulence on the part of the tubercle bacilli inoculated eleven months previously, M. Moussu states that:—

(1) The byres had been progressively cleared of tuberculosis by tuberculin;

(2) The heifer was born in a byre previously cleared of tuberculosis from a non-tuberculous mother;

(3) The heifer had never sucked, being reared on the bucket on non-tuberculous milk, as the byre cleared by the use of tuberculin.

(4) The cold abscess appeared eleven months after vaccination at the seat of inoculation. If such had been the data of the problem renewal of virulence of B C G would have to be allowed. The authors, however, examine the problem in collecting more precise data.

(1) The veterinarian Dr. Arkwright affirms that from 1919 to 1927 he has at various times tested cows on the farm by the intradermal method and always got some positive reactions; since 1927 no testing has been done up to July, 1931, when the cows were tested by the subcutaneous method: 45 per cent. positive reactors were found.

(2) The proprietor knows nothing as to health of the mother of the heifer, nor whether she is still on the farm.

(3) The heifer was never isolated and was brought up on the mixed milk of the farm.

(4) Dr. Arkwright states that the cyst was 20 cm. (8-in.) from site of inoculation and was below the shoulder.

The authors ask whether, in view of these new facts, a long commentary is necessary. They repeat what was stated at the London Congress, that not one of the scientists and practitioners who have used B C G in bovines (even animals of a few days old) by intravenous or subcutaneous inoculation in doses of 50 to 100 mgrms. has had to observe and report a single case where B C G has been the point of departure of lesions capable of being interpreted as indicating a return of virulence of the vaccine inoculated.

W. R. D.

[**On the Cultural Differentiation of Tubercle Bacilli** Flückiger, G. *Schweiz. Archiv f. Tierhlk.* 1931, Vol. 73, No. 7/8.]

In 1930 Wolters and Dehmel published a paper on this subject and stated that the three types of tubercle bacilli were distinguishable by cultivation on two special culture media, namely—that of Petragnani and Besredka's broth. The author tested these methods and comes to the same conclusions.

The Petragnani medium is composed of milk—potato—egg and Besredka's broth consists of egg yolk diluted with soda solution and water. Malachite green is added to both for purposes of differentiation of the organisms. (The methods of preparation are described fully.)

The growths of the bacilli are conveniently described by a table.

Avian.	Human.	Bovine.
Most rapid growth visible in 3 days	Visible in 7 days	Slowest growth visible in 10 days.
Moist widespread growth with raised wrinkles	Dry raised growth with craters	Scanty glistening colonies with round summits.
Straw yellow ...	Gold-yellow	Pale yellow.
Upper layers of medium turn yellow	Upper layers usually turn yellow ...	Discolouration rarely occurs.

A good coloured plate illustrates the appearance of 20-day-old cultures of human and of bovine bacilli and a 10-day-old culture of avian bacilli. The latter differs markedly in appearance from the two former, which show differences chiefly in the state of the raised parts.

Besredka's broth allows differentiation of the avian from the human and bovine types but is of no value in differentiation of the two latter. In order to obtain the above characteristic growths the author recommends that sub-cultures be made of the strain which is to be examined.

Various other well-known methods and one new one (that of Loewenstein, for culturing tubercle bacilli from the blood stream) are discussed and the author thinks that progress in the differentiation of tubercle bacilli without the use of test animals has been made.

J. T. E.

[**Contribution on the Pathology and Therapy of Chronic Diseases of Synovial Bursæ at the Withers.** Flachs, Veterinary Major. *Zeitschrift für Veterinärkunde.* August, 1930.]

An officer's charger showed a swelling at the withers the size of a man's head. No signs of discomfort or fever were present. Exploratory puncture on the left side released three-quarters of a litre of yellow fluid containing white flakes. On the right side being opened half-a-litre escaped.

Both sides soon filled up again and the openings were therefore enlarged. Various dressings were applied or injected. After four months' unavailing treatment it was decided that recovery could not be expected until the pathological secretion of the bursa was stopped.

With a view to achieving this result, both cavities were filled to overflowing with paraffin dur. cooled to 50° C., by means of a syringe of 100 c.c. capacity fitted with a long nozzle.

The wax maintained its consistency well and, as healing progressed, part of each plug was pushed through its opening. In the course of time the surrounding tissues healed over such portions of the plugs as had not extruded and the animal's capacity for work appeared to be unimpaired.

H. H.

[**A Case of Fracture of the Coffin-bone.** Virchow, Staff Veterinary. *Zeitschrift für Veterinärkunde.* August, 1930.]

A riding horse picked up a long nail in the off fore foot and subsequently showed marked lameness. Examination with a sound disclosed a canal running upwards and forwards from the region of the bar.

Under chloral narcosis the canal was opened up and some necrosed portion of coffin-bone curetted. The patient's condition became worse and the dressing was removed in ten days.

A further operation was performed, during the course of which a sequestrum was found. It was removed without difficulty and proved to be a triangular piece of the coffin-bone measuring 3 by 4 by 5 cm. A dressing was applied and left in position for 14 days. The patient was fit for work in six months.

Diagnosis was delayed owing to the fact that the line of fracture was not well defined at first. X-rays would have been of assistance.

H. H.

[**Lacto-serum in Medical Therapeutics.** Degois, Dr. (Veterinarian, Rambouillet). *Bulletin de L'Académie Vétérinaire de France.* Vol. 4, No. 6.]

The author draws attention to the remarkable effects produced in surgical cases through the action of milk serum (whey). Wounds which have long resisted ordinary applications cicatrize quickly under its action as do ulcers, fistulous withers, etc., and its internal administration has been attended with the like happy results in maladies of the horse, dog, cat, sheep, rabbit and bird.

The best results are obtained when it is used in cases of dyspepsia and inflammatory conditions not due to parasites. Lacto-serum is not a parasiticide. When used fresh it is quite innocuous and its stimulating action on the liver and biliary ways produces laxative effects.

Jaundice of the horse and of the dog have yielded to treatment by the remedy.

Beach first pointed out the efficiency of whey in coccidosis and the author has obtained excellent results in rabbits and pheasants affected by the malady. Ulcerous stomatitis of lambs, sometimes accompanied by diarrhœa, and often fatal, has yielded to treatment by lacto-serum. Details are given of cases successfully treated in the horse (indigestion and catarrh of the intestines); dog (jaundice, stomatitis, distemper); cat (gastro-enteritis); rabbit (coccidiosis); pheasant (coccidiosis).

The quantity recommended is about 3 pints per day for the horse, 6 ounces for the dog and 1½ ounces for the cat.

W. R. D.

[**The Destruction of Dogs with Magnesium Salts.** Kunze. *D.T.W.* No. 31. August 1st, 1931. 486.]

The author discusses the method of destroying dogs which consists in the injection of cyanide of potassium into the thoracic cavity. While it is effective it cannot be considered quite painless or very rapid, and since it possesses other disadvantages the method is not an ideal one. Reference is made to the use of magnesium salts for the above purpose, but these methods usually have been abandoned on account of difficult technique or slowness in action.

A saturated solution of magnesium chloride, used intravenously, is stated by the author to be an excellent method for destroying dogs painlessly and rapidly. The solution is prepared by dissolving two parts of the salt in one part of water, and 5-12 c.cs. is all that is required. The animal is secured on a table and the metatarsal vein just superior to the point of the hock-joint is raised by pressure. In long-haired breeds it may be necessary to clip the hair from the region. After injection death occurs on the average in 20 seconds. If a sublethal dose should by chance be given, a second dose is easily administered since the animal lies in a deeply comatose condition.

When dealing with small dogs the intracardial route is usually chosen, the solution being introduced through the fifth intercostal space on the left side, about two finger-breadths above the breast-bone. A long needle should be used and the injection made when blood appears in the syringe. In larger dogs the metatarsal or the saphena vein is more convenient. Magnesium chloride is not poisonous in the usual sense, is cheap, can be used without special instruments, and the author considers it an elegant, humane and excellent method of destroying dogs.

W. L. S.

N.V.M.A. Divisional Report.

Scottish Metropolitan Division.*

A meeting of the above Division was held in the Zoological Gardens, Corstorphine, Edinburgh, on Wednesday, May 27th, 1931, by kind permission of Mr. T. H. Gillespie, Director-Secretary.

Professor Mitchell, the President, occupied the Chair, and there were also present: *Members.*—Dr. J. Russell Greig, Principal O. Charnock Bradley, Messrs. P. Wilson, E. Brown, J. E. Wilson, W. S. Gordon, D. R. Wilson, A. Manson Larnach, J. F. Player, W. Nairn, T. P. Young, Ed. J. Duncan, Dr. T. W. M. Cameron, Professor R. G. Linton, Professor G. F. Boddie, Messrs. A. R. C. Bowie, H. M. Wilson, J. Reid, Captain J. N. Ritchie, Major J. G. McGregor, Major E. D. S. Robertson, Messrs. J. Macfarlane, J. Henderson and W. C. Miller (Hon. Secretary). *Visitors.*—Major J. J. M. Soutar, Messrs. E. Heeley, J. Johnston, I. E. C. Stuart, L. Dougal, E. M. Mackay, T. G. McNabb, E. G. Wood, S. Jennings, H. W. J. Hossack, J. H. Taylor, H. McVean, A. Thomson, J. Anderson, W. G. Edwards, J. D. Harper, J. Ker and W. F. Barton.

The meeting was so arranged that during the afternoon, whilst the general meeting was in progress, opportunity was given for ladies (who accompanied the majority of the members) to see the animals in the Zoological Gardens.

The minutes of the last meeting were read, approved and signed. Apologies for inability to attend were intimated from the following gentlemen:—Messrs. W. Scott, E. J. H. Sewell, Geo. A. M. Harle, J. Aitken, Major A. Baird, Major R. G. Anderson, Messrs. H. F. Downie, William Anderson, J. N. Baillie, Major A. Spreull, Major J. B. Robertson, Professor D. Imrie, Messrs. William Lothian, H. Bain, A. Brownlee, J. Brown, A. Gofton and T. Grahame.

Correspondence.—(1) From Major Grahame Williamson conveying his sincere appreciation of the privilege of Honorary Membership of the Division which he had enjoyed during his tour of military service at Redford and Piershill Barracks.

(2) From the Secretary, N.V.M.A., relating to the undesirable practice, of which some members had been guilty, of using letters after their names on bill-heads, etc., which referred to their membership of Divisions of the National Association. The opinion was expressed that the complaint could refer to few, if any, members of the Scottish Metropolitan Division. The meeting was in full agreement with the sentiments of the letter.

New Members.—The names of the following gentlemen, having been duly nominated for membership at the last meeting of the Division, were read:—Professor D. Imrie, Messrs. J. B. Mackie, H. Bain. W. Smith Gordon, John Reid and J. E. Wilson. Mr. W. Nairn moved, and Dr. T. W. M. Cameron seconded, that these gentlemen be duly elected members. This was carried unanimously.

Nominations.—Mr. F. Mayne, of Auchterarder, was nominated for membership by Professor G. F. Boddie.

Branch Executive Committee.—The Council recommended that Mr. J. N. Ritchie be elected to serve upon the Branch Executive Committee. On the motion of the President, seconded by Mr. Nairn, Mr. Ritchie was declared duly elected to the Branch Committee.

Presidential Address.—The President then read his Presidential Address.

At the conclusion, the President intimated that, contrary to general custom, he would welcome discussion upon his address.

[The President's Address, and a report of the discussion, are reproduced earlier in this issue.—Ed.]

Principal Bradley said that he would ask the members to indicate their appreciation of the stimulating address they had heard by supporting his motion that they accord to the President a sincere vote of thanks.

This was duly carried with acclamation.

The President, in acknowledgment, said he desired to thank them very much for the way in which they had received his address.

He would like to ask them to accord to Mr. Gillespie a cordial vote of thanks for the privilege of holding that meeting in the Library of the Zoological Society, and for allowing them to use the Fellows' Room for tea.

This was carried with enthusiasm, and the meeting then terminated.

Subsequently, the members and their ladies were entertained to tea in the Fellows' Room by Professor and Mrs. Mitchell.

Wm. C. Miller, *Hon. Secretary.*

*Received for publication November 4th.

Eleventh International Veterinary Congress.

Executive Committee.

A meeting of the Special Committee appointed at the closing meeting of the Congress for the purpose of closing the accounts and issuing the reports, was held at 10, Red Lion Square, London, W.C.1, on Thursday, October 8th, 1931. There were present Sir John M'Fadyean (in the chair), Lieut.-Colonel J. W. Brittlebank, Professor J. B. Buxton, Major-General Sir John Moore, Mr. G. H. Livesey, Lieut.-Colonel P. J. Simpson and Mr. J. Willett.

The minutes of the previous meeting, held on October 7th, 1930, were read and signed as correct.

Congress Report.—The Secretary reported that the publication and distribution of the three volumes of the Congress Report had been completed, the cost of printing the reports being £983 13s. 2d. and the cost of packing, etc., £183 11s. 11d., making a total cost of £1,122 5s. 7d. There remain in stock for disposal 400 copies of the report. The Secretary's report was approved.

Accounts.—The Hon. Treasurer submitted a statement of accounts of the Congress which had been audited by Messrs. Woodhouse and Wilkinson. The accounts showed that the total cost of the Congress was £5,891 16s. 8d. and that towards this sum the amount contributed from the British Congress (1914) Fund was £3,205 18s. 5d. The Auditors' report was approved and ordered to be published in accordance with the statutes of the Congress.

British Congress (1914) *Fund.*—The question of the disposal of the balance left in the British Congress (1914) Fund was deferred for consideration at a meeting to be held in January next.

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The Receipts and Payments Account is as follows:—

Eleventh International Veterinary Congress, London, 1930.

Receipts and Payments Account for the Period from January 1st, 1925, to September 30th, 1931.

	£ s. d.
To Balance from 1914 Congress	0 18 7
,, Subscriptions	2,479 6 9
,, Sale of Reports	115 8 9
,, Sale of Badges	39 18 10
,, Transferred from Exhibition Account ...	50 5 4
,, Amount contributed from British Congress (1914) Fund	3,205 18 5
	£5,891 16 8

	£ s. d.	£ s. d.
By Delegates' Expenses		82 16 2
,, Clerical Assistance	442 10 4	
,, Honorarium and Expenses, General Secretary	420 0 0	
,, Expenses, Honorary Secretary	103 8 8	
		965 19 0
,, Printing and Stationery (including reports for General and Sectional Meetings) ...		1,768 3 5
,, Printing Three Volumes of Proceedings	938 13 8	
,, Packing, Postage, etc., of Proceedings	183 11 11	
		1,122 5 7
,, Permanent Commission ...		83 3 2
,, Interpreters and Translators ...		124 10 8
,, Sundries	31 1 4	
,, Petty Cash and Office Postages	229 17 11	
,, Telephone	6 18 9	
		267 18 0
,, Hire of Central Hall		406 4 5
,, Entertainments:—		
Conversazione at Natural History Museum	305 16 6	
Reception, May Fair Hotel	133 2 3	
R.A.F. Band	49 7 0	
Congress Dinner	44 13 7	
Toast-master	9 9 0	
Ladies' Excursions	334 9 0	
		876 17 4
,, Official Photographers... ...		21 0 0
,, Reporters		34 15 0
,, Badges		61 0 6
,, Office Furniture		60 3 2
,, Audit Fee		10 10 0
,, Bank Charges		6 10 3
		£5,891 16 8

J. W. Brittlebank,
Honorary Treasurer.

We have audited the above account and certify it to be correct.

Woodhouse and Wilkinson,
Chartered Accountants,
28, Queen Street, London, E.C.4.

October 2nd, 1931.

In Parliament.

The following questions and answers have been recorded in the House of Commons recently :—

Tuberculosis (Calmette Treatment).

Mr. Groves asked the Minister of Health whether the Medical Research Council have completed their report on the result of their inquiries into the deaths of 76 infants in Lübeck, Germany, following the administration of the Calmette prophylactic tuberculosis vaccine; and, if so, when it is proposed to make the report public?

Sir H. Young : I am sending the hon. Member a copy of a reply given by my predecessor to a question on this subject on November 6th, 1930. As stated in that reply, the report made to the Medical Research Council by their two representatives who visited Germany was a confidential one and dealt with technical matters which are of interest only to research workers. It is, therefore, not proposed to make the report public. The report did not traverse the ground of the official German inquiry which was made by the Imperial Board of Health. The substance of the report on that inquiry was given in reply to a question on February 17th last, a copy of which I am also sending to the hon. Member.

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Horses (Export).

Sir R. Gower asked the Minister of Agriculture what was the number of horses exported from this country to Continental ports for butchery purposes during each of the past six months, respectively; the places to which such horses were respectively consigned; and what were the methods used for the slaughter of such horses, respectively?

Sir J. Gilmour : According to information supplied to the Ministry's inspectors at the port of shipment, the number of horses shipped from authorised ports to Continental ports during each of the last six months and intended for immediate slaughter on arrival, were as follow :—

May	159
June	96
July	108
August	199
September	230
October	371

All these horses were shipped to Rotterdam, Holland, in which country the use of the mechanical killer at both public and private slaughterhouses is compulsory by law.

. . . . .

Performing Animals (Foreign Exhibitors).

Sir R. Gower asked the Home Secretary whether, with a view to discouraging public performances by animals in this country, he will consider the desirability of refusing to grant permits to alien exhibitors of performing animals who desire to enter this country for the purpose of practising their professions?

Sir H. Samuel : I do not think that I should be justified in taking the action suggested. Parliament has dealt with the matter in the Performing Animals (Regulation) Act which *inter alia* requires exhibitors to be registered and empowers justices to prohibit summarily any performance in which there is reason to suppose that the training or exhibition of an animal has been accompanied by cruelty. No discrimination was made in the Act between British subjects and foreigners, and it would not be right for me to introduce one without the authority of Parliament.

. . . . .

Fresh Milk.

Major Braithwaite asked the Minister of Agriculture whether his attention had been called to the importation of fresh milk from Denmark and Holland; whether such milk was accompanied by any certificate that it was produced under conditions comparable to those enforced in this country under the Milk and Dairies Order; what steps were being taken, having regard to the existence of the disease in Denmark and Holland, to ascertain whether such imports contained the virus of foot-and-mouth disease and to eliminate the risk of the disease being spread in this country; and what action was being taken to require the distributors of such milk to disclose its origin to consumers.

Sir J. Gilmour : My attention has been called to this matter. Imported milk is not required to be accompanied by a certificate to the effect mentioned in the question, but the Public Health (Imported Milk) Regulations made by the Minister of Health in 1926 require the registration of all consignees of milk—other than condensed or dried milk—from abroad, and further lay down a standard of hygienic quality to which all such milk must conform. As regards the danger of introducing the virus of foot-and-mouth disease, I am informed that under the Danish law all liquid milk exported must have been pasteurised, and that although such pasteurisation is not absolutely required by the Dutch law, it is the practice in Holland to pasteurise milk intended for exportation to this country, and I understand that imported fresh milk is again pasteurised in this country before it is distributed. The process of pasteurisation is fatal to the virus of foot-and-mouth disease.

In reply to the last part of the question, no Marking Order applicable to imported milk has been made under the Merchandise Marks Act, 1926, but the question of marking is to some extent covered by section 1 of that Act.

The Case for Sweepstakes in England.

Major-General Sir John Moore's Proposal.

In a letter published, under the above headings, in *The Morning Post* of November 24th, Major-General Sir John Moore, K.C.M.G., C.B., F.R.C.V.S., says :

"The article on 'Sweepstakes in England,' published in your issue of Friday, November 20th, unquestionably will arouse much public interest, for there can be no doubt that the large amount of money being subscribed in this country for the benefit of hospitals in the Irish Free State is not only a subject of envy but prompts the question whether this outflow of wealth can not be diverted for our own home needs.

"In these days of rigid national economy it is becoming increasingly difficult for Government to meet its obligations in respect of grants-in-aid, and the financial situation is such that certain grants have been abolished, some have been cut, and other suspended *sine die*.

"It would seem, therefore, that if the conscience of the nation, and in particular the conscience of our legislators, could be relaxed, and sweepstakes on classic races permitted, moneys in substitution of Government grants could be readily found and the overworked taxpayer relieved. The spread-over afforded by sweepstakes would be a light yoke, and the chance of a fortune at little outlay would appeal to a sporting community.

"To limit the promotion of National Sweepstakes to the benefit of hospitals or to the bolstering up of the totalisator would be wrong. Measures under direct State control and administration should have prior, or at all events equal, claim. For instance, the Development Commission appointed under the Development and Road Improvement Funds Acts of 1909 and 1910 is charged with the advance of money for Agricultural and Veterinary Education and Research, Rural Industry, Reclamation of Land, Harbours and Fisheries.

"The grant in aid of the rebuilding of the Royal Veterinary College, *viz.* £150,000, promised by Government on the findings of a Departmental Committee, has been suspended in consequence of financial stringency. Again, the annual grant of £30,000 for light horse breeding administered by the War Office has been abolished and the smaller grants towards heavy horse breeding have been reduced.

"The development of agriculture and its allied industries and sciences would appear to be special directions in which sweepstakes would be most appropriate, for the horse, the central figure of all sweepstakes on classic races, *ceteris paribus*, is an indispensable factor of agriculture and agricultural industry. The control and mitigation of animal disease communicable to human beings

is another direction inviting attention from the medical and health aspect.

"The machinery required to administer sweepstakes of necessity should be representative of the various interests concerned and should have the full recognition and surveillance of Departments of State. Operations covering a probable ten million pounds per annum in the gross would prove a welcome relief from taxation and afford pleasure to a large number of people desirous of chancing their luck."

Glasgow College Prize Distribution.

Mr. Hugh Begg, F.R.C.V.S., one of the directors of the College, who presided at the annual prize distribution in the College on November 25th, in place of Professor Glaister, who was unable to attend through illness, said he could conceive that there were several students present that day who would never have been able to pursue the study of veterinary science if it had not been for the efforts of the Governors of the College, who had had the daring to maintain it against overwhelming odds. Since the days when the Board of Agriculture and the Secretary of State for Scotland had taken every step to bring about the eventual extinction of the College by the withdrawal of grants, the directors had striven to keep the College going, with the result that its ramparts were now stronger than they had ever been.

As they were aware, the College had not received a single penny from the Government for many years, and it was in the lap of the gods whether any assistance would ever be received again.

It could not be argued against them that the standard had suffered, because there was one way, by examination results, to prove that it had not. Three times, including this year, out of the last five years the Fitzwygram Prize, which was the greatest honour in the profession, had been gained by a student of the College. The successful student on this occasion was Mr. William A. Milligan, Annan.

Dr. Whitehouse, the Principal of the College, explained that the Fitzwygram prize was open for competition among students at colleges throughout Great Britain. It was awarded to the student who had the largest aggregate of marks over four years, and it proved outstanding practical ability as well as academic ability. It was the highest honour that a student could gain in the veterinary profession.

Sir Charles Cleland, who presented the prizes, said he had performed the same duty some years ago, and since that time a great deal had happened. They were there that day as an example of Glasgow's grit and resilience. They had been deprived, to his mind, unwisely, of the Government support which was their right, but in spite of that they had gone forward with that determination for which the West of Scotland was notable. The result was that the College was now in a better position than it had ever been, judged from every standpoint.

His belief was that the College, dependent upon itself and upon others who appreciated its efforts, deserved hearty congratulations. He had always held that it was the bounden duty of local authorities to help institutions such as theirs, and he thought they might go forward with every confidence that the support which had been accorded them in the past was not likely to be denied them in the future.

Proposing a vote of thanks to Sir Charles Cleland, Mr. A. A. Hagart-Speirs, of Elderslie, said they had to keep it up, and not allow "these worthy politicians" to think they could send students to the East Coast to get better veterinary education. In any case there were far more cattle on which to experiment in the West than in the East.

The annual report showed that during the past year 93 students presented themselves to the Board of Examiners for the Diploma granted by the Royal College of Veterinary Surgeons, and that 47 were successful, four with first-class honours, and eight with second-class honours.

It was also pointed out that the demand for the services of young veterinary surgeons showed no sign of abating, and as far as could be ascertained, every Glasgow graduate was at work. The grants from town and county councils were described as satisfactory, but the hope was expressed that, in view of the increasing number of students attending the College, they would be increased proportionately.

The Prize-Winners.

The prize-winners were:—

Class D.—The Highland and Agricultural Society silver medal in veterinary medicine and veterinary surgery; the College first-class certificates in veterinary medicine, surgery and parasitology; and the Fitzwygram Prize—William A. Milligan, Annan.

Class C.—The H. and A.S. silver medal in materia medica, and the College first-class certificates in materia medica and hygiene—James A. Brown, Biggar.

The H. and A.S. silver medal in hygiene, and the College first-class certificate in hygiene—Miss M. L. Somervail, Glasgow.

The H. and A.S. silver medal in pathology, and the College first-class certificate in pathology—Samuel Jamieson, Glasgow.

Class B.—The gold medal presented by the Board of governors to the student gaining the highest marks in the professional examination in anatomy, and the College first-class certificate in senior anatomy and physiology—Miss Helen J. Mitchell, Glasgow.

The H. and A.S. silver medal in stable management, and the College first-class certificate in senior anatomy, physiology and stable management; first honours in the professional examination—John W. Macaulay, Glasgow.

The H. and A.S. silver medal in physiology and the College first-class certificate in senior anatomy and physiology; second honours in the professional examination—James C. Brown, Campbeltown.

The H. and A.S. silver medal in senior anatomy, and the College first-class certificate in senior anatomy—Alex. S. Chapman, Paisley.

Class A.—The H. and A.S. silver medals in chemistry and biology, and the College first-class certificates in junior anatomy, chemistry and biology; first honours in the professional examination—John M'Lintock, Kilmacolm.

The H. and A.S. silver medal in junior anatomy, and the College first-class certificates in junior anatomy, chemistry and biology; second honours in the professional examination—J. G. Murray, Glasgow.

Special silver medal in junior anatomy, and the College first-class certificate in junior anatomy—Alex. S. Chapman, Paisley.

New Knowledge of Vitamins.

Sir Frederick Gowland Hopkins, in his presidential address to the two hundred and sixty-ninth anniversary meeting of the Royal Society on Monday, devoted some of his remarks to vitamin discoveries. Although, unlike the hormones, vitamins were of exogenous origin, their activities in the body were equally potent and their functions in general as indispensable. The number of known vitamins had grown to seven or eight, and the study of their functions had become a complex matter. At the same time, nobody who was in contact with the evidence doubted the reality and indispensability of these several functions. It was highly satisfactory to know that we were now within measurable distance of knowing the chemical structure of two of these substances.

We now possessed proof that Vitamin A was closely related to the carotenes, and this knowledge might well lead, without long delay, to the artificial synthesis of the vitamin itself. With respect to Vitamin D it seemed probable, if not yet quite certain, that its artificial production was already accomplished. Some four years ago the constituent of animal and vegetable substances, which was converted into the antirachitic Vitamin D by ultra-violet radiation, was identified as ergosterol by Rosenheim and Webster at the National Institute for Medical Research,

and concurrently by Windaus in Göttingen. A team of workers at the National Institute, led by Dr. R. B. Bourdillon, appeared now to have arrived at the next stage, of isolating the vitamin itself, in crystalline form, from the mixed products of irradiation; and Professor Windaus, following with his co-workers a different route, had again arrived simultaneously at the same goal. There was no doubt that the substance which the British group now term "calciferol," and which they had isolated as a dinitrobenzoate from the mixed product, was identical with the "Vitamin D_2" which Windaus and Linsert obtained by a different method; and there was little doubt that this substance, as obtained in either laboratory, was the essential Vitamin D in a state of practical purity. One milligramme of calciferol had an antirachitic activity corresponding to 40,000 of the newly accepted international units.

Such progress in the chemistry of vitamins could not but be highly satisfactory to all those (and their name was now legion) who had been engaged upon the study of their nutritional functions. Our ignorance of their chemistry and the claim that they function in such infinitesimal amounts left, at any rate till recently, in the minds of many who had not been in touch with the evidence, some scepticism as to their real importance. Any disbelief in the significance of this field of investigation was, however, fated to disappear, and he ventured to predict that in quite other fields discriminate studies of animal nutrition were yet to yield unexpected results of much practical importance.

Notes and News.

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events.

Dec. 7th.—N.V.M.A. Editorial Committee Meeting at 2 Verulam Buildings, Gray's Inn, W.C.1.

Dec. 10th.—Meeting of the West of Scotland Division, N.V.M.A., at Glasgow.

Animal Diseases Committee, Agricultural Research Council.

The Secretary of State for the Colonies has agreed to the appointment of Mr. Eustace Montgomery, M.R.C.V.S., his Adviser on Animal Health, as a member of the Animal Diseases Committee of the Agricultural Research Council.

In our issue of November 21st we announced that Major-General Sir John Moore, F.R.C.V.S., had also been co-opted as a member of this Committee.

The Late Sir David Bruce.

The world of medical science mourns the loss of Major-General Sir David Bruce, who passed away at the end of last week, at the age of 76, only four days after the death of his gifted wife.

"Bruce belonged to that small body of men who laid, deep and strong, the foundations of tropical medicine, and so opened immense new tracts of territory to the enterprise of the white man," says *The Times*.

"It was intuition rather than research which led Bruce to his first great discovery. A prolonged investigation into the cause of Malta fever had failed to disclose that cause, and Bruce, who was conducting the work, began to despair of success when, one day, he was shown a series of charts relating to possible sources of infection. Goats' milk was included among these sources. His quick mind seized upon this possibility, and he began at once to test the idea. Within the space of a few years he had discovered the *Micrococcus melitensis* and had succeeded in showing that this organism was the cause of 'Malta,' 'Rock,' or 'Mediterranean' fever, and that it was transmitted by the milk of goats. Further, he was able to cultivate the organism outside of the human body. His discovery, which has never been challenged, has enabled a peculiarly troublesome disease to be controlled and even, in many areas, to be stamped out.

"This early triumph brought Bruce a wide fame and secured for him the scientific career which he so ardently desired. During the few years which followed it he was engaged on researches on cholera and on methods of minimisation against that disease. In 1894 the Government of Natal asked him to investigate the diseases known as 'nagana' and 'tsetse-fly disease,' which were supposed to be distinct and separate conditions. Within two months Bruce discovered that the conditions were in fact one and the same disease, and that both were dependent upon the presence in the blood of a protozoan organism known as a trypanosome. Six months later Bruce returned to Zululand and stayed there two years, during which time he discovered that the tsetse-fly acted as the carrier of the trypanosome. He was thus the first to show that an insect may carry a protozoan parasite of a pathological kind. Bruce studied 'nagana' in a large number of domestic animals, and also observed it, in its latent form, in the wild animals of South Africa. Subsequent observers have found but little to add to this work.

"In 1900 Bruce was ordered to join the Commission investigating the outbreak of dysentery in the Army in South Africa. In 1903 he went, at the request of the Royal Society, to Uganda to make further investigations into the nature of sleeping sickness. When he arrived a trypanosome had been observed by Castellani in a small number of cases of the disease. Thanks to Bruce's energy and intuition these observations were rapidly extended, and the most conclusive evidence obtained that, in all cases of this disease, the trypanosome was present. Bruce showed further that a certain tsetse-fly, the *Glossina palpalis*, acted as the carrier of the trypanosome, and obtained evidence showing that the distribution of the disease and of the fly were strikingly similar."

Army Veterinary Service.

MOVEMENTS OF OFFICERS.

Major J. J. Plunkett, O.B.E., is at present on leave *ex.* India until January 17th, 1932, inclusive; he joins the Northern Command on January 18th, for duty at the Remount Depôt, Melton Mowbray, on reversion to the British establishment.

Major G. E. Oxspring is at present on leave *ex* India until January 17th, 1932, inclusive; he joins the Aldershot Command on January 18th for duty as instructor and bacteriologist at the Royal Army Veterinary School, on reversion to the British establishment.

Major S. L. Slocock, M.C., F.R.C.V.S., arrived home from Egypt on the evening of November 21st; he was posted to the Eastern Command on November 23rd and is now doing duty at Hounslow.

LONDON GAZETTE—WAR OFFICE—TERRITORIAL ARMY.

Nov. 24th.—Lieut. W. Tweed to be Captain (October 1st).

REGULAR ARMY RESERVE OF OFFICERS.

Major F. W. H. Thomas, having attained the age limit of liability to recall, ceases to belong to the Res. of Off. (November 25th).

Exmoor Ponies for the Mines.—Some of the big Exmoor farmers who had given up breeding Exmoor ponies in consequence of the decline in trade are likely to resume, in view of a revival in the demand for ponies from coal-pits.

Royal Veterinary College.

A lecture, arranged by the Institute of the Horse, in aid of the building fund of the Royal Veterinary College, will be given by Professor F. T. G. Hobday in the theatre of the Royal Veterinary College, Camden Town, on Thursday, December 10th, at 6 p.m. The subject is "What Veterinary Science Does for the Horse."